REMARKS

I. Status of the Claims

Claims 1-12 and 17-20 are pending.

In the amendments presented above, claims 1, 3, 6, 8, 11 and 18-20 have been amended.

No new matter is added by these amendments.

II. Claim Objections

Claims 1 and 10 were objected to. In the amendments above, claim 1 has been amended to recite "comprising the steps of." This amendment should overcome the objections.

III. Claims 18 and 20 Meet the Enablement Requirement

Applicant disagrees that claims 18 and 20 fail to meet the enablement requirement of § 112, first paragraph.

All of the various foods listed in claims 18 and 20 share a common element - namely, a sugary solution that can be made using methods such as those described in the specification. The sugar solution can be added to the various foods when they are produced using methods commonly known to the person of ordinary skill in the art. Specific examples are not required for each type of food to enable the person of ordinary skill in the art to use the floral containing sugary solution. All that is required to meet the enablement requirement is sufficient disclosure such that the person of ordinary skill in the art can make and use the claimed subject matter without undue experimentation.

No objective evidence has been provided that undue experimentation would be required to make the various foods listed in the subject claims. Without presentation of objective evidence demonstrating that undue experimentation is required, the claims are presumed to meet the enablement requirement.

If the presentation of such evidence, e.g., Wands factors, is forthcoming, then Applicant respectfully requests issuance of a non-final Office Action so that they may properly address such factors.

In view of the above, the burden on the Patent Office to establish that the claims are not enabled has not been met. Thus, the rejection is improper and should be withdrawn.

IV. Claims 1-3, 6, 8, 11, and 18-20 are Definite

Applicant traverses the indefiniteness rejection of claims 1-3, 6, 8 , 11 and 18-20.

With particular reference to claim 1, with respect to the phrase "cultivated with cultivation techniques suitable for the production of material that can be intended for human nutrition," this phrase refers to the harvested flower material being suitable for human consumption. It is understood by the person of ordinary skill in the art, that cultivation techniques for plants intended for human consumption are bound by stricter safety requirements compared to cultivation techniques for ornamental plants, which in fact are not edible. In this context, the claimed subject matter limits the decorative flow material to be grown under those cultivation techniques suitable for the growth of plants to provide edible plants. As a consequence, the decorative flow material will contain little or no trace or residue of the plant protection products normally used in floriculture.

Nonetheless, to provide a clearer claim, this phrase has been replaced with the phrase "cultivated with cultivation techniques suitable for the production of edible plant material." This amendment and these remarks should overcome the rejection.

With reference to claim 2, the details regarding these farming techniques can be found in the specification, for example, at page 3, line 24 to page 7, line 11. When this disclosure is coupled with the knowledge of the person of ordinary skill in the art, the terms are clear and definite.

In particular, organic agriculture is a production system that

> sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved.

See International Federation of Organic Agriculture Movements, http://en.wikipedia.org/wikiOrganic_farming (attached as Exhibit A). Also see http:www/unikassel.de/fb11/fnt/download/frei/dII/IFOAM%20Standard.pdf for further information on the recognized standards applicable to organic agriculture (attached as Exhibit B).

With reference to claim 3, the expression "useful in the horticultural field" has been used to refer to any suitable and known technique used in the cultivation of fruits and vegetables. To clarify claim 3, claim 3 has been amended to recite "in the cultivation of fruits and vegetables." This amendment should overcome the rejection.

With respect to the terms "late" and "early" in claim 6, these terms have been deleted. This amendment should overcome the rejection.

The phrase "natural and/or non-natural" has been deleted from each of claims 8, 11 and 19. This amendment should overcome the rejection.

The phrase "fresh or seasoned cheese" has been amended to "cheese" in each of claims 18 and 20. This amendment should overcome the rejection.

In view of the above, the claims are clear and precise and meet the definiteness requirement.

V. Claims 12 and 17-20 are Patentable over Emarkaryan

Applicant traverses the rejection of claims 12 and 17-20 under § 102(b) over Emarkaryan (US 3,060,033).

Emarkaryan is generally directed to a rose containing food additive consisting solely of whole petals of Rosa demascena trigintipetala Dieck and sugar. The additive is produced by a dry mixing process that does not use heat (Col. 1, line 39). Moreover, Emarkaryan goes to great lengths to describe a process that preserves intact rose petals. See Example 1 at page 1, Column 2, lines 45-60. Thus, the resulting product in Emarkaryan would be expected to have intact rose petals and would not use heat.

In stark contrast, the aqueous sugary solution of claim 12 is prepared by the addition of fragmented floral material to a sugary solution. The heat treatment in claim 12 differs from the process described in Emarkaryan, which makes sense given the aqueous nature of the solution as recited in claim 1.

In addition to the above, the food additive of Emarkaryan can only be prepared starting from the very specific rose variety mentioned above, and the resulting additive is not suitable for pastries or other products that require heat treatment for their preparation (see Col. 3, lines 19-23). The rose additive of Emarkaryan is said to be suitable for use only in connection with jellies

or other solutions, whereas the aqueous solutions of claim 12 are suitable for preparations that involve harsher heat treatments.

Thus, the product of claims 12 and 17-20 are different than those of Emarkaryan. Accordingly, the rejection is improper and should be withdrawn.

VI. Claims 1-11 are Patentable over the Combination of Emarkaryan and Francis

Applicant disagrees that claims 1-11 are obvious over Emarkaryan in view of Francis (Wiley Encyclopedia Food Sci. and Technol, 2nd Ed., Vol. 1-4, pp. 23-5-2321).

As discussed above, the process and products of Emarkaryan differ markedly from those claimed in the instant application. Emarkaryan lacks a pasteurization step, is only suitable for the specific rose petals and sugar, and the petals are not fragmented. Where heat as being described in Emarkaryan (Example 4), the temperature differs from that used in claim 1. In particular, the heating temperature recited in the claims is below the boiling point of the solution, whereas in Example 4 of Emarkaryan, the heat is harsher and consists of two stages, both at or above the boiling point of the solution (above 100 °C) as it pertains to the preparation of a jam and not a decorative flower sugary solution.

Francis does not cure the deficiencies of Emarkaryan. In particular, even if the pasteurization of Francis is applied in Emarkaryan, all of the claim elements would not be present. Instead, a dry solution of whole rose petals and sugar would be pasteurized, which could result in caramelizing or burning of Emarkaryan's dry solution. No aqueous solution that includes fragmented floral material would be present.

In addition, there is no proper teaching or suggestion in Emarkaryan to look to Francis for pasteurization. Instead, at Col. 1, line 39 of Emarkaryan it is stated that the preparation requires no heat. In Col. 3, lines 16-24, Emarkaryan clearly describes that the solution does not tolerate extensive heating. Emarkaryan thus teaches away from using pasteurization.

Another distinction between claim 1 and the combination of Emarkaryan and Francis are the improved and unexpected properties provided by the process of the claims. In particular, fragmenting of the floral material increases the exchange surface between the floral material and the sugary solution. The extraction of aromatic components continues after the pasteurization step into the resting period. The claimed process would provide an improved edible product than the product produced by Emarkaryan.

For the reasons provided above, claim 1 is patentable over the combination of Emarkaryan and Francis. Each of claims 2-11 depends directly or indirectly from claim 1 and is patentable over Emarkaryan and Francis for at least the same reasons.

Accordingly, Applicant request withdrawal of the rejection.

VII. Conclusion

Applicant respectfully requests entry of the foregoing remarks to place the case in better condition for appeal.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicant hereby requests any necessary extension of time. If there is a fee occasioned by this response, including any extension fee, that is not covered by an accompanying payment, please charge any deficiency to Deposit Account No. 50/2762 (Ref. No. R2019-7701US).

By:/Christopher R. Rhodes/_____
Christopher R. Rhodes, Reg. No. 47,022
Attorney for Applicant
LANDO & ANASTASI, LLP
One Main Street
Cambridge, MA 02142
Telephone: 617-395-7000
Facsimile: 617-395-7070

Exhibit A

Organic farming

From Wikipedia, the free encyclopedia

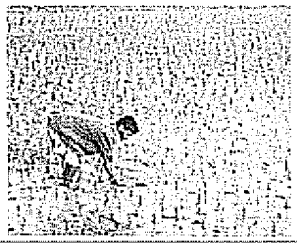
Organic farming is a form of agriculture that relies on crop rotation, green manure, compost, biological pest control, and mechanical cultivation to maintain soil productivity and control pests, excluding or strictly limiting the use of synthetic fertilizers and synthetic pesticides, plant growth regulators, livestock feed additives, and genetically modified organisms.[1] Since 1990, the market for organic products has grown at a rapid pace, to reach $46 billion in 2007. This demand has driven a similar increase in organically managed farmland. Approximately 32.2 million hectares worldwide are now farmed organically, representing approximately 0.8 percent of total world farmland.[2] In addition, as of 2007 organic wild products are harvested on approximately 30 million hectares .[3]

Organic agricultural methods are internationally regulated and legally enforced by many nations, based in large part on the standards set by the International Federation of Organic Agriculture Movements (IFOAM), an international umbrella organization for organic organizations established in 1972. IFOAM defines the overarching goal of organic farming as follows:

> "Organic agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and a good quality of life for all involved."
>
> —International Federation of Organic Agriculture Movements[4]

Contents

Agriculture



General

Agribusiness · Agriculture
Agricultural science · Agronomy
Animal husbandry
Extensive farming
Factory farming · Free range
Industrial agriculture
Intensive farming
Organic farming · Permaculture
Sustainable agriculture
Urban agriculture

History

History of agriculture
Neolithic Revolution
Muslim Agricultural Revolution
British Agricultural Revolution
Green Revolution

Particular

Aquaculture · Dairy farming
Grazing · Hydroponics · IMTA
Intensive pig farming · Lumber
Maize · Orchard
Poultry farming · Ranching · Rice
Sheep husbandry · Soybean
System of Rice Intensification
Wheat

Categories

Agriculture by country
Agriculture companies
Agriculture companies, U.S.
Biotechnology
Farming history
Livestock
Meat processing
Poultry farming

 *Agropedia portal*

History

The organic movement began in the early 1930s and early 1940s as a reaction to agriculture's growing reliance on synthetic fertilizers. Artificial fertilizers had been created during the 18th century, initially with superphosphates and then ammonia derived fertilizers mass-produced using the Haber-Bosch process developed during World War I. These early fertilizers were cheap, powerful, and easy to transport in bulk. Similar advances occurred in chemical pesticides in the 1940s, leading to the decade being referred to as the 'pesticide era'.

Sir Albert Howard is widely considered to be the father of organic farming.[3] Further work was done by J.I. Rodale in the United States, Lady Eve Balfour in the United Kingdom, and many others across the world.

As a percentage of total agricultural output, organic farming has remained tiny since its beginning. As environmental awareness and concern increased amongst the general population, the originally supply-driven movement became demand-driven. Premium prices from consumers and in some cases government subsidies attracted many farmers into converting. In the developing world, many farmers farm according to traditional methods which are comparable to organic farming but are not certified. In other cases, farmers in the developing world have converted for economic reasons [5]. As a proportion of total global agricultural output, organic output remains small, but it has been growing rapidly in many countries, notably in Europe.

Much before the awareness about the Organic farming through the movements began, there was a well developed Organic farming system in India. Ancient Indian texts describe the methods of Organic farming. This is being practiced even today in many of the villages in India. Sanjeevan system is an example of such organic farming method. [6]

Methods

> "An organic farm, properly speaking, is not one that uses certain methods and substances and avoids others; it is a farm whose structure is formed in imitation of the structure of a natural system that has the integrity, the independence and the benign dependence of an organism"
>
> —Wendell Berry, "The Gift of Good Land"

Organic cultivation of mixed vegetables in Capay, California. Note the hedgerow in the background.

Soil management

Plants need nitrogen, phosphorus, and potassium as well as micronutrients, but getting enough nitrogen, and particularly synchronization so that plants get enough nitrogen at the right time (when plants need it most), is likely the greatest challenge for organic farmers.[7] Crop rotation and green manure ("cover crops") help to provide nitrogen through legumes (more precisely, the *Fabaceae* family) which fix nitrogen from the atmosphere through symbiosis with the bacteria rhizobia. Intercropping, which is sometimes used for insect and disease control, can also increase soil nutrients, but the competition between the legume and the crop can be problematic and wider spacing between crop rows is required.[7] Crop residues can be ploughed back into the soil, and different plants leave different amounts of nitrogen, potentially aiding synchronization.[7] Organic farmers also use animal manure (which must be composted), certain processed fertilizers such as seed meal and various mineral powders such as rock phosphate and greensand, a naturally occurring form of potash which provides potassium. Altogether these methods help to control erosion. In some cases pH may need to be amended. Natural pH amemdments include lime and sulfur, but in the U.S. some synthetically compounds such as iron sulfate, aluminum sulfate, magnesium sulfate, and soluble boron products are allowed in organic farming.[8]:43

Mixed farms with both livestock and crops can operate as ley farms, whereby the land gathers fertility through growing nitrogen-fixing forage grasses such as white clover or alfalfa and grows cash crops or cereals when fertility is established.[7] Farms without livestock ("stockless") may find it more difficult to maintain fertility, and may rely more on external inputs such as imported manure as well as grain legumes and green manures, although grain legumes may fix limited nitrogen because they are harvested.[7] Horticultural farms growing fruits and vegetables which operate in protected conditions are often even more reliant upon external inputs.[7]

Weed control

After nutrient supply, weed control is the second priority for farmers.[8] Techniques for controlling weeds include handweeding, mulch, corn gluten meal, a natural preemergence herbicide, flame, garlic and clove oil, borax, , pelargonic acid, table salt, solarization (which involves spreading clear plastic across the ground in hot weather for 4-6 weeks), vinegar, and various other homemade remedies.[8] :45-65 One recent innovation in rice farming is to introduce ducks and fish to wet paddy fields, which eat both weeds and insects.[9]

Controlling other organisms

Organisms aside from weeds which cause problems include athropods (e.g. insects, mites) and nematodes. Fungi and bacteria can cause disease.

Insect pests are a common problem, and insecticides, both non-organic and organic, are controversial due to their environmental and health effects. One way to manage insects is to ignore them and focus on plant health, since plants can survive the loss of about a third of lead area before suffering severe

growth consequences.[8]:67 To avoid using insecticides, one can select naturally-resistant plants, put bags around the plants, remove dying material such as leaves, fruit, and diseased plants, covering plants with a solid barrier ("row cover"), hosing, encouraging and releasing beneficial organisms and beneficial insects, planting companion plants and polycultures, various traps, sticky cards (which can also be used to assess insect prevalence), and season extension. Biological pest control uses natural predators to control pests. Recommended beneficial insects include minute pirate bugs, big-eyed bugs, and to a lesser extent ladybugs (which tend to fly away), all of which eat a wide range of pests. Lacewings are also effective, but tend to fly away. Praying mantis tend to move slower and eat less heavily. Parasitoid wasps tend to be effective for their selected prey, but like all small insects can be less effective outdoors because the wind controls their movement. Predatory mites are effective for controlling mites.[8]:66-90

Several of pesticides approved for organic use have been called green pesticides such as spinosad and neem. Generally, but not necessarily, organic pesticides are safer and more environmentally friendly than synthetic pesticides.[8]:92 The main three organic insecticides used are Bt (a bacterial toxin), pyrethrum and rotenone. Surveys have found that fewer than 10% of organic farmers use these pesticides regularly; one survey found that only 5.3% of vegetable growers in California use rotenone while 1.7% use pyrethrum (Lotter 2003:26). As of 2005, the controversial and highly toxic insecticide rotenone was theoretically approved for U.S. organic farmers, but no products had been reviewed by the Organic Materials Review Institute.[10] Nicotine sulfate may also be used;[11] although it breaks down quickly, it is extremely toxic, nearly as toxic as aldicarb.[8]:104 Less toxic but still effective organic insecticides include neem, spinosad, soaps, garlic, citrus oil, capsaicin (repellent), *Bacillus popillae*, *Beauvaria bassiana*, and boric acid.[8]:110 Pesticides should be rotated to minimize pest resistance.

The first disease control strategy involves keeping the area clean by removing diseased and dying plants and ensure that the plants are healthy by maintaining water and fertilization.[8]:129 Compost tea is sometimes promoted and can be effective,[12] but there is concern over whether these are ineffective or even harmful.[13] Polycultures reduce the ability of disease to spread. Disease-resistant cultivars can be purchased. Organic fungicide include the bacteria Bacillus subtilis, Bacillus pumilus, and Trichoderma harzianum which are mainly effective for diseases affecting roots. Bordeaux mix contains copper, which can be used as an organic fungicide in various forms. Sulfur is effective against fungus as well as some insects. Lime sulfur is also available, but can damage plants. Potassium and sodium bicarbonate are also effective against fungus. Some plant activators, which increase plants' defense systems,[14] are considered organic although most are synthetic.[8]:141 Other synthetic fungicides not generally allowed are classified as protectants and systemics.[8]:142-44

Standards

Standards regulate production methods and in some cases final output for organic agriculture. Standards may be voluntary or legislated. As early as the 1970s organic producers could be voluntarily certified by private associations. In the 1980s, governments began to produce organic production guidelines. Beginning in the 1990s, a trend toward legislation of standards began, most notably with the 1991 EU-Eco-regulation developed for European Union[15], which set standards for 12 countries, and a 1993 UK program. The EU's program was followed by a Japan program in 2001, and in 2002 the United States created the National Organic Program (NOP).[16] As of 2007 over 60 countries have regulations on organic farming (IFOAM 2007:11). In 2005 IFOAM created the Principles of Organic Agriculture, an international guideline for certification criteria.[17] Typically the agencies do not certify individual farms, but rather accredit certification groups.

Materials used in organic production and foods are tested independently by the Organic Materials Review Institute.

Composting

Under USDA organic standards, manure must be subjected to proper thermophilic composting and allowed to reach a sterilizing temperature. If raw animal manure is used, 120 days must pass before the crop is harvested.[18]

Economics

The economics of organic farming, a subfield of agricultural economics, encompasses the entire process and effects of organic farming in terms of human society, including social costs, opportunity costs, unintended consequences, information asymmetries, and economies of scale. Although the scope of economics is broad, agricultural economics tends to focus on maximizing yields and efficiency at the farm level. Mainstream economics takes an anthropocentric approach to the value of the natural world: biodiversity, for example, is considered beneficial only to the extent that it is valued by people and increases profits. Some governments such as the European Union subsidize organic farming, in large part because these countries believe in the external benefits of reduced water use, reduced water contamination by pesticides and nutrients of organic farming, reduced soil erosion, reduced carbon emissions, increased biodiversity, and assorted other benefits.

Organic farming is labor and knowledge-intensive whereas conventional farming is capital-intensive, requiring more energy and manufactured inputs. Organic farmers in California have cited marketing as their greatest obstacle.[19]

Geographic producer distribution

The markets for organic products are strongest in North America and Europe, which as of 2001 are estimated to have $6 and $8 billion respectively of the $20 billion market (2003:6). However, as of 2007 organic farmland is distributed across the globe. Australasia has 39% of the total organic farmland with Australia's 11.8 million hectares, but 97 percent of this land is sprawling rangeland (2007:35), which results in total sales of approximately 5% of US sales (2003:7). Europe has 23 percent of total organic farmland (6.9 million hectares), followed by Latin America with 19 percent (5.8 million hectares). Asia has 9.5 percent while North America has 7.2 percent. Africa has a mere 3 percent. See also Organic farming by country.

Besides Australia, the countries with the most organic area are Argentina (3.1 million hectares), China (2.3 million hectares), and the United States (1.6 million hectares). Much of Argentina's organic farmland is pasture, like that of Australia (2007:42). Italy, Spain, Germany, Brazil, Uruguay, and the UK follow the United States by the amount of land managed organically (2007:26).

Growth

As of 2001, the estimated total market value of certified organic products was estimated to be $20 billion. By 2002 this was $23 billion and by 2007 more than $46 billion according to Organic Monitor (Willer/Kilcher 2009).

In recent years both Europe (2007: 7.8 million hectares/European Union: 7.2 million hectares) and North America (2007: 2.2 million hectares) have experienced strong growth in organic farmland. However, this growth has occurred under different conditions. While the European Union has shifted agricultural subsidies to organic farmers in recognition of its environmental benefits, the United States has taken a free market approach[20]. As a result, as of 2007 4 percent of the European Union's farmland was organically managed compared to just 0.6 percent of United States farmland (Willer/Kilcher 2009).

IFOAM's most recent edition of **The World of Organic Agriculture: Statistics and Emerging Trends 2009** lists the countries which had the most hectares in 2007. The country with the most organic land is Australia with more than 12 million hectares, followed by Argentina, Brasil and the US. In total 32.2 million hectares were under organic management in 2007. For 1999 11 million hectares of organically managed land are reported (Willer/Kilcher 2009).

In recent years organic agriculture has grown tremendously. Considering this rapid growth, it is within the nature of organic farming to keep it from becoming a large scale industrial business as conventional farming has become (Duram 183). Duram, Leslie. Good Growing. Santa Cruz: Bison Books, 2005.

Productivity and profitability

A 2006 study suggests that converted organic farms have lower pre-harvest yields than their conventional counterparts in developed countries (92%) and that organic farms have higher pre-harvest yields than their low-intensity counterparts in developing countries (132%). The researcher attributes this to a relative lack of expensive fertilizers and pesticides in the developing world compared to the intensive, subsidy-driven farming of the developed world. Nonetheless, the researcher purposely avoids making the claim that organic methods routinely outperform green-revolution (conventional) methods.[21] This study incorporated a 1990 review of 205 crop comparisons which found that organic crops had 91% of conventional yields.[22] A major US survey published in 2001, analyzed results from 150 growing seasons for various crops and concluded that organic yields were 95-100% of conventional yields.[23]

Lotter (2003:10) reports that repeated studies have found that organic farms withstand severe weather conditions better than conventional farms, sometimes yielding 70-90% more than conventional farms during droughts. A 22-year farm trial study by Cornell University published in 2005 concluded that organic farming produces the same corn and soybean yields as conventional methods over the long-term averages, but consumed less energy and used zero pesticides. The results were attributed to lower yields in general but higher yields during drought years.[24] A study of 1,804 organic farms in Central America hit by Hurricane Mitch in 1998 found that the organic farms sustained the damage much better, retaining 20 to 40% more topsoil and smaller economic losses at highly significant levels than their neighbors.[25]

On the other hand, a prominent 21-year Swiss study found an average of 20% lower organic yields over conventional, along with 50% lower expenditure on fertilizer and energy, and 97% less pesticides.[26] A long-term study by U.S Department of Agriculture Agricultural Research Service (ARS) scientists concluded that, contrary to widespread belief, organic farming can build up soil organic matter better than conventional no-till farming, which suggests long-term yield benefits from organic farming. [27] An 18-year study of organic methods on nutrient-depleted soil concluded that conventional methods were superior for soil fertility and yield in a cold-temperate climate, arguing that much of the benefits from organic farming are derived from imported materials which could not be regarded as "self-sustaining".[28]

While organic farms have lower yields, organic methods require no synthetic fertilizer and pesticides. The decreased cost on those inputs, along with the premiums which consumers pay for organic produce, create higher profits for organic farmers. Organic farms have been consistently found to be as or more profitable than conventional farms with premiums included, but without premiums profitability is mixed (Lotter 2003:11). Welsh (1999) reports that organic farmers are more profitable in the drier states of the United States, likely due to their superior drought performance.[29]

In 2008 the UN Environmental Programme (UNEP) and UN Conference on Trade and Development (UNCTAD) issued a report which stated that "organic agriculture can be more conducive to food

security in Africa than most conventional production systems, and that it is more likely to be sustainable in the long-term".[30] The report assessed 114 projects in 24 African countries, finding that "yields had more than doubled where organic, or near-organic practices had been used" and that soil fertility and drought resistance improved.[31]

In 2009, a review concluded that organic production was more profitable in Wisconsin, when including price premiums.[32]

Macroeconomic impact

Organic methods often require more labor,[33] providing rural jobs but increasing costs to urban consumers.

Motivations

Agriculture in general imposes external costs upon society through pesticides, nutrient runoff, excessive water usage, and assorted other problems. As organic methods minimize some of these factors, organic farming is believed to impose fewer external costs upon society.[34] A 2000 assessment of agriculture in the UK determined total external costs costs for 1996 of 2343 million British pounds or 208 pounds per hectare.[35] A 2005 analysis of these costs in the USA concluded that cropland imposes approximately 5 to 16 billion dollars ($30 to $96 per hectare), while livestock production imposes 714 million dollars.[36] Both studies concluded that more should be done to internalize external costs, and neither included subsidies in their analysis, but noted that subsidies also influence the cost of agriculture to society. Both focused on purely fiscal impacts. The 2000 review included reported pesticide poisonings but did not include speculative chronic effects of pesticides, and the 2004 review relied on a 1992 estimate of the total impact of pesticides.

Pesticides

Some pesticides may damage human health with direct exposure and the environment, and most organic farms use less pesticides than conventional farms. The main three pesticides used in organic farming are Bt (a bacterial toxin), pyrethrum, rotenone, copper and sulphur [37]. Surveys have found that fewer than 10% of organic farmers use these pesticides regularly; one survey found that only 5.3% of vegetable growers in California use rotenone while 1.7% use pyrethrum (Lotter 2003:26). Reduction and elimination of chemical pesticide use is technologically challenging.[38] Few organic farms manage to eliminate the use of pesticides entirely[39]; organic pesticides are often used to complement other pest control strategies.

Pesticide runoff is one of the most significant effects of pesticide use. The USDA Natural Resources Conservation Service tracks the environmental risk posed by pesticide water contamination from farms, and its conclusion has been that "the Nation's pesticide policies during the last twenty six years have succeeded in reducing overall environmental risk, in spite of slight increases in area planted and weight of pesticides applied. Nevertheless, there are still areas of the country where there is no evidence of progress, and areas where risk levels for protection of drinking water, fish, algae and crustaceans remain high".[40]

Pest resistant genetically modified crops have been proposed as an alternative to pesticide use, however concerns over the safety and the long term benefits of genetically modified food, result in the genetic modification being widely opposed in the organic farming movement.[9]

Food quality and safety

Organic food is widely believed by the lay public to be healthier than conventional food,[41] although the research is inconclusive.[41] Animals fed organic diets appear to have slightly better health and reproductive performance, but similar tests in humans have not been performed. In some vegetables and cereals there is a lower concentration of protein, but it is of higher-quality. Nutrients appear to be similar with the exception of a trend towards slightly higher vitamin C in organic food.[41]

Only tentative conclusions can be drawn on the relative safety of organic food. Organic produce is likely to have less agrochemical residues, but these residues are generally below the acceptable daily intake and their health impact is questionable.[42] Organic food also appears to have lower nitrate concentrations, but the health impact of nitrates is debated. Both organic and conventional food are expected to have similar concentrations of persistent organic pollutants and heavy metals. Data is limited on natural plant pesticides and their health effects, as well as the relative risks from bacterial pathogens.[42]

Concerns have been raised that the higher expense of organic food (ranging from 45 to 200%) could limit the recommended consumption of 5 servings per day of vegetables and fruits, which are known to improve health and reduce cancer regardless of whether they are organic or conventional.[42]

Two studies have found that children fed organic diets experienced significantly lower organophosphorus pesticide exposure than children fed conventional diets.[43][44] Although the researchers did not collect health *outcome* data in this study, they concluded "it is intuitive to assume that children whose diets consist of organic food items would have a lower probability of neurologic health risks". A 2007 study found that consumption of organic milk is associated with a decrease in risk for eczema, although no comparable benefit was found for organic fruits, vegetables, or meat.[45]

Extensive scientific research is being carried out in Switzerland at over 200 farms to determine differences in the quality of organic food products compared to conventional in addition to other tests. The FiBL Institute has been investigating the differences at over 200 farms. It states that "organic products stand out as having higher levels of secondary plant compounds and vitamin C. In the case of milk and meat, the fatty acid profile is often better from a nutritional point of view. As far as carbohydrates and minerals, organic products are no different from conventional products. However, in regard to undesirables such as nitrate and pesticide residues, organic products have a clear advantage.[46] A £12m EU-funded investigation into the difference between organic and ordinary farming published in 2007 found that organic foods have more nutritional value.[47] A recent study found that organically grown produce has double the flavonoids, an important antioxidant.[48] A 2007 study found that organically grown kiwifruit had more antioxidants than conventional kiwifruit.[49]

Genetically modified organisms

A key characteristic of organic farming is rejection of genetically engineered products, including plants and animals. On October 19, 1998, participants at IFOAM's 12th Scientific Conference issued the Mar del Plata Declaration, where more than 600 delegates from over 60 countries voted unanimously to exclude the use of genetically modified organisms in food production and agriculture. From this point, it became widely recognized that GMOs are categorically excluded from organic farming.

Although opposition to the use of any transgenic technologies in organic farming is strong, agricultural researchers Luis Herrera-Estrella and Ariel Alvarez-Morales continue to advocate integration of transgenic technologies into organic farming as the optimal means to sustainable agriculture, particularly in the developing world.[50] Similarly, some organic farmers question the rationale behind the ban on the use of genetically engineered seed because they see it a biological

technology consistent with organic principles [51]

Although GMOs are excluded from use in organic farming, there is concern that the pollen from genetically modified crops is increasingly contaminating organic and heirloom genetics making it difficult, if not impossible, to keep these genetics from entering the organic food supply. International trade restrictions limit the availability GMOs to certain countries.

The actual dangers that genetic modification could pose to the environment or, supposedly, individual health, are hotly contended. See GM food controversy.

Soil conservation

In *Dirt: The Erosion of Civilizations*, geomorphologist David Montgomery outlines a coming crisis from soil erosion. Agriculture relies on roughly one meter of topsoil, and that is being depleted ten times faster than it is being replaced.[52] No-till farming, which some claim depends upon pesticides, is regarded as one way to minimize erosion. However, a recent study by the USDA's Agricultural Research Service has found that manure applications in organic farming are better at building up the soil than no-till despite tillage.[53][54]

Climate change

In *The Organic Answer to Climate Change*, Anthony Meleca argues that organic agriculture — with its emphasis on closed nutrient cycles, biodiversity, and effective soil management — has the capacity to mitigate and even reverse the effects of climate change.[55]

According to the Rodale Institute, which has been comparing organic agricultural systems and conventional systems since 1981, organic agriculture also can be used to mitigate global warming by decreasing fossil fuel emissions and sequestering carbon in the soil. The elimination of synthetic nitrogen in organic systems decreases fossil fuel consumption by 33 percent (LaSalle)and carbon sequestration takes CO2 out of the atmosphere by putting it in the soil in the form of organic matter which is often lost in conventionally managed soils. Carbon sequestration occurs at especially high levels in organic no-till managed soil according to the Rodale Institute.

Nutrient leaching

Excess nutrients in lakes, rivers, and groundwater can cause algal blooms, eutrophication, and subsequent dead zones. In addition, nitrates are harmful to aquatic organisms by themselves. The main contributor to this pollution is nitrate fertilizers whose use is expected to "double or almost triple by 2050".[56] Researchers at the United States National Academy of Sciences found that that organically fertilizing fields "significantly [reduces] harmful nitrate leaching" over conventionally fertilized fields: "annual nitrate leaching was 4.4-5.6 times higher in conventional plots than organic plots".[57]

Scientists believe that the large dead zone in the Gulf of Mexico is caused in large part by agricultural pollution: a combination of fertilizer runoff and livestock manure runoff. A study by the United States Geological Survey (USGS) found that over half of the nitrogen released into the Gulf comes from agriculture. The economic cost of this for fishermen may be large, as they must travel far from the coast to find fish.[58]

At the 2000 IFOAM Conference, researchers presented a study of nitrogen leaching into the Danube River. They found that nitrogen runoff was substantially lower among organic farms and suggested that the external cost could be internalized by charging 1 euro per kg of nitrogen released.[59]

A 2005 study found a strong link between agricultural runoff and algae blooms in California.[60]

Biodiversity

A wide range of organisms benefit from organic farming, but it is unclear whether organic methods confer greater benefits than integrated agri-environmental conventional programs.[61] Nearly all non-crop, naturally-occurring species observed in comparative farm land practice studies show a preference in organic farming both by population and richness.[62][63] Spanning all associated species, there is an average of 30% more on organic farms versus conventional farming methods.[64] Birds, butterflies, soil microbes, beetles, earthworms, spiders, vegetation, and mammals are particularly affected. Organic crops use little or no herbicides and pesticides and thus biodiversity fitness and population density benefit.[63] Many weed species attract beneficial insects that improve soil qualities and forage on weed pests.[65] Soil-bound organisms often benefit because of increased bacteria populations due to natural fertilizer spread such as manure, while experiencing reduced intake of herbicides and pesticides commonly associated with conventional farming methods.[66] Increased biodiversity, especially from soil microbes such as mycorhizzae, have been proposed as an explanation for the high yields experienced by some organic plots, especially in light of the differences seen in a 21-year comparison of organic and control fields.[67]

The level of biodiversity that can be yielded from organic farming provides a natural capital to humans. Species found in most organic farms provides a means of agricultural sustainability by reducing amount of human input (e.g. fertilizers, pesticides) [68] . Farmers that produce with organic methods reduce risk of poor yields by promoting biodiversity. Common game birds such as the ring-necked pheasant and the northern bobwhite often reside in agriculture landscapes, and are a natural capital yielded from high demands of recreational hunting. Because bird species richness and population are typically higher on organic farm systems, promoting biodiversity can be seen as logical and economical.

Biological research on soil and soil organisms has proven beneficial to the system of organic farming. Varieties of bacteria and fungi break down chemicals, plant matter and animal waste into productive soil nutrients. In turn, the producer benefits by healthier yields and more arable soil for future crops.[69] Furthermore, a 21-year study was conducted testing the effects of organic soil matter and its relationship to soil quality and yield. Controls included actively managed soil with varying levels of manure, compared to a plot with no manure input. After the study commenced, there was significantly lower yields on the control plot when compared to the fields with manure. The concluded reason was an increased soil microbe community in the manure fields, providing a healthier, more arable soil system.[67]

Sales and marketing

Organic farmers report that marketing and distribution are difficult obstacles. Most of organic sales are concentrated in developed nations. These products are what economists call credence goods in that they rely on uncertain certification. As food prices rise, organic products may experience a decrease in quantity demanded. A 2008 survey by WSL Strategic Retail found that interest in organic products had dropped since 2006, and that 42% of Americans polled don't trust organic produce. The Hartman Group reports that 69% of Americans claim to occasionally buy organic products, down from 73% in 2005. The Hartman Group says that people may be substituting local produce for organic produce.[70]

Distributors

In the United States, 75% of organic farms are smaller than 2.5 hectares and in California 2% of the farms account for over half of the sales (Lotter 2003:4). Groups of small farms join together in cooperatives such as Organic Valley, Inc. to market their goods more effectively.

Over the past twenty years, however, most of these cooperative distributors have merged or been bought out. Rural sociologist Philip H. Howard has researched the structure and transformation of the organic industry in the United States. He claims that in 1982 there were 28 consumer cooperative distributors but as of 2007 there are only 3, and he has created a graphic displaying the consolidation.[71] His research shows that most of these small cooperatives have been absorbed into large multinational corporations such as General Mills, Heinz, ConAgra, Kellogg, and assorted other brands. This consolidation has raised concerns among consumers and journalists of potential fraud and degradation in standards. Most of these large corporations sell their organic products through subsidiaries, allowing them to keep their names off the labels.[72]

Farmers' markets

Price premiums are important for the profitability of small organic farmers, and so many sell directly to consumers in farmers' markets. In the United States the number of farmers' markets has grown from 1,755 in 1994 to 4,385 in 2006.[73]

Capacity building

Organic agriculture can contribute to meaningful socio-economic and ecologically sustainable development, especially in poorer countries [74]. On one hand, this is due to the application of organic principles, which means efficient management of local resources (e.g. local seed varieties, manure, etc.) and therefore cost-effectiveness. On the other hand, the market for organic products – at local and international level – has tremendous growth prospects and offers creative producers and exporters in the South excellent opportunities to improve their income and living conditions.

Organic Agriculture is a very knowledge intensive production system. Therefore capacity building efforts play a central role in this regard. There are many efforts all around the world regarding the development of training material and the organization of training courses related to Organic Agriculture. Big parts of existing knowledge is still scattered and not easy accessible. Especially in Developing Countries this situation remains an important constraint for the growth of the organic sector.

For that reason, the International Federation of Organic Agriculture Movements created an Internet Training Platform whose objective is to become the global reference point for Organic Agriculture training through free access to high quality training materials and training programs on Organic Agriculture. In November 2007, the Training Platform hosted more than 170 free manuals and 75 training opportunities.

Controversy

A number of critics contest the notion that organic agricultural systems are more friendly to the environment and more sustainable than high-yielding farming systems. Among these critics are Norman Borlaug, father of the "green revolution," Nobel Peace Prize laureate, who asserts that organic farming practices can at most feed 4 billion people, after expanding cropland dramatically and destroying ecosystems in the process[75], and Prof A. Trewavas.[76]

The debate has been summarized in an exchange between Trewavas and Lord P. Melchett, and published by a major supermarket, concerned about examining the issues.

One study from the Danish Environmental Protection Agency found that, area-for-area, organic farms of potatoes, sugar beet and seed grass produce as little as half the output of conventional farming.[77]

In 2008 a study from UN Environmental Programme concluded that organic methods greatly increase yields in Africa and [30] a review of over two hundred crop comparisons argued that organic farming could produce enough food per capita to sustain the current human population; the difference in yields between organic and non-organic methods were small, with non-organic methods resulting in slightly higher yields in developed areas and organic methods resulting in slightly higher yields in developing areas.[21]

That analysis has been severely criticised by Alex Avery, who contends that the review claimed many non-organic studies to be organic, misreported organic yields, made false comparisons between yields of organic and non-organic studies which were not comparable, counted high organic yields several times by citing different papers which referenced the same data, and gave equal weight to studies from sources which were not impartial and rigorous university studies[78].

Urs Niggli, director of the FiBL Institute contends that the wave of newspaper articles like 'Organic food exposed' or 'The hypocrisy of organic farmers'[79] are a part of a global campaign against organic farming that take their arguments mostly from the book 'The truth about organic farming', by Alex Avery of the Hudson Institute. [80]

In 1998, Dennis Avery of the Hudson Institute claimed the risk of E. coli infection was eight times higher when eating organic food rather than non-organic food, using the Center for Disease Control (CDC) as a source. When the CDC was contacted, it stated that there was no evidence for the claim. [80][81] The *New York Times* commented on Avery's attacks: "The attack on organic food by a well-financed research organization suggests that, though organic food accounts for only 1 percent of food sales in the United States, the conventional food industry is worried."[82]

Organic agriculture can reduce the level of negative externalities from (conventional) agriculture. Whether this is seen as private or public benefits depends upon the initial specification of property rights.[83] However, it is clear that agriculture has been undervalued and underestimated as a means to combat global climate change. Soil carbon data recorded by The Rodale Institute show that regenerative organic agricultural practices are among the most effective strategies for mitigating CO2 emissions.[84]

See also

- Agroecology
- Biodynamic agriculture
- Certified Naturally Grown
- Industrial agriculture
- List of organic gardening and farming topics
- Motivations for organic agriculture
- Organic food
- Organic movement
- Permaculture
- Seasonal food
- Sustainable agriculture
- Wildculture
- Organic Farming Digest
- Australian Organic Farming and Gardening Society

Citations

1. ^ Directorate General for Agriculture and Rural Development of the European Commission | What is organic farming
2. ^ organic-world
3. ^ [1]
4. ^ "Definition of Organic Agriculture". IFOAM. http://www.ifoam.org/growing_organic/definitions/doa/index.html. Retrieved on 2008-09-30.
5. ^ Paull, John "China's Organic Revolution", Journal of Organic Systems (2007) 2 (1): 1-11.
6. ^ http://www.fao.org/DOCREP/ARTICLE/AGRIPPA/656_en01.htm
7. ^ *a b c d e f* Watson CA, Atkinson D, Gosling P, Jackson LR, Rayns FW. (2002). "Managing soil fertility in organic farming systems". *Soil Use and Management* **18**: 239-247. doi:10.1111/j.1475-2743.2002.tb00265.x. http://www3.interscience.wiley.com/journal/119192119/abstract. Retrieved on 2009-05-29. Preprint with free full-text.
8. ^ *a b c d e f g h i j k* Gillman J. (2008). *The Truth About Organic Farming*. Timber Press.
9. ^ *a b* How to feed the world By Laurent Belsie (February 20, 2003 edition) The Christian Science Monitor
10. ^ Material fact sheets – rotenone.
11. ^ Some Pesticides Permitted in Organic Gardening.
12. ^ Scheuerell SJ, Mahaffee WF (2004). "Compost tea as a container medium drench for suppressing seedling damping-off caused by Pythium". *Phytopathology* **94** (11): 1156–1163. doi:10.1094/PHYTO.2004.94.11.1156.
13. ^ Brinton W et al. (2004). "Compost teas: Microbial hygiene and quality in relation to method of preparation". *Biodynamics*: 36–45. http://www.woodsend.org/pdf-files/compost-tea-BD04R.pdf. Retrieved on 2009-04-15.
14. ^ Effect of Plant Activators on Disease Resistance and Yield in Tomato and Canola.
15. ^ Control Union World Group. EEC Regulation No. 2092/91
16. ^ USDA NOP Program Standards. Accessed April 2, 2008
17. ^ IFOAM. (2005). The IFOAM Norms
18. ^ National Organic Program Regulations
19. ^ Strochlic, R.; Sierra, L. (2007). Conventional, Mixed, and "Deregistered" Organic Farmers: Entry Barriers and Reasons for Exiting Organic Production in California. California Institute for Rural Studies.
20. ^ Dimitri, C.; Oberholtzer, L. (2006) EU and US Organic Markets Face Strong Demand Under Different Policies
21. ^ *a b* Badgley, C. *et al ' (2006). Organic agriculture and the global food supply,* description
22. ^ Stanhill, G. (1990). The comparative productivity of organic agriculture. Agriculture, Ecosystems, and Environment. 30(1-2):1-26
23. ^ The Information Bulletin of the Organic Farming Research Foundationaccessdate=2005-12-18
24. ^ Lang, S. (2005). Organic farming produces same corn and soybeans yields, but consumes less energy and no pesticides, study finds Cornell University News Service. Accessed April 2, 2008
25. ^ Holt-Gimenez, E. (2000) Hurricane Mitch Reveals Benefits of Sustainable Farming Techniques. PANNA.
26. ^ Maeder, P. *et al* (2002). *Soil Fertility and Biodiversity in Organic Farming*. Science v296, , 1694-1697. Accessed April 2, 2008.
27. ^ ARS (2007) Organic Farming Beats No-Till?
28. ^ Kirchmann H et al. (2007). Comparison of Long-Term Organic and Conventional Crop-Livestock Systems on a Previously Nutrient-Depleted Soil in Sweden. *Agronomy Journal* **99**:960-972. doi:10.2134/agronj2006.0061.
29. ^ The Economics of Organic Grain and Soybean Production in the Midwestern United States.
30. ^ *a b* UNEP-UNCTAD. (2008). Organic Agriculture and Food Security in Africa. United Nations. Free full-text.
31. ^ Howden D. Organic farming 'could feed Africa'. The Independent.
32. ^ Chavas JP et al. (2009). "Organic and Conventional Production Systems in the Wisconsin Integrated Cropping Systems Trial: II.". *Agronomy Journal* **101** (2): 288. http://agron.scijournals.org/cgi/content/abstract/101/2/288. Retrieved on 2009-04-07.
33. ^ Morison, James. (2005). Survey and analysis of labor on organic farms in the UK and Republic of Ireland. [International Journal of Agricultural Sustainability](3):24-43
34. ^ Marshall, G. (1991). *Review of Marketing and Agricultural Economics* **59** (3): 283–296. http://ageconsearch.umn.edu/bitstream/12390/1/59030283.pdf.
35. ^ Pretty et al. (2000). "An assessment of the total external costs of UK agriculture". *Agricultural Systems*

65 (2): 113–136. doi:10.1016/S0308-521X(00)00031-7. http://www.essex.ac.uk/bs/staff/pretty/AgSyst%20pdf.pdf.
36. ^ Tegtmeier, E.M.; Duffy, M. (2005). "External Costs of Agricultural Production in the United States". *The Earthscan Reader in Sustainable Agriculture*. http://www.organicvalley.coop/fileadmin/pdf/ag_costs_IJAS2004.pdf.
37. ^ Beckerman, Janna. "Using Organic Fungicides". Planet Natural. http://www.planetnatural.com/site/xdpy/kb/organic-fungicides.html. Retrieved on 2009-02-05.
38. ^ Pesticides, agriculture and the environment(12/12/2005) Written by : Collective Scientific Expertise Unit, Communications Department / Unit : Collective Scientific Expertise Unit / Date of creation : 19/01/2006 / Date of last update : 18/02/2009
39. ^ Tamm, L.; et al.. "Assessment of the Socio-Economic Impact of Late Blight and State of the Art of Management in European Organic Potato Production Systems". http://www.orgprints.org/2936/. Retrieved on 2009-02-05.
40. ^ "Trends in the Potential for Environmental Risk from Pesticide Loss from Farm Fields". USDA Natural Resources Conservation Service. http://www.nrcs.usda.gov/technical/land/pubs/pesttrend.html. Retrieved on 2007-09-29.
41. ^ [a] [b] [c] Magkos F (2003). "Organic food: nutritious food or food for thought? A review of the evidence". *International journal of food sciences and nutrition* **54** (5): 357–371. doi:10.1080/09637480120092071.
42. ^ [a] [b] [c] Magkos F (2006). "Organic Food: Buying More Safety or Just Peace of Mind? A Critical Review of the Literature". *Critical reviews in food science and nutrition* **46** (1): 23–56. doi:10.1080/10408690490911846.
43. ^ Curl, C. L. et al. (March 2003). study "Organophosphorous Pesticide Exposure of Urban and Suburban Preschool Children with Organic and Conventional Diets". Environmental Health Perspectives, 111(3). http://ehp.niehs.nih.gov/members/2003/5754/5754.pdf study. Retrieved on 2007-11-03.
44. ^ Lu, Chensheng et al. (February 2006). "Organic Diets Significantly Lower Children's Exposure to Organophosphorus Pesticides" (PDF). Environmental Health Perspectives 114(2). http://www.ehponline.org/members/2005/8418/8418.pdf. Retrieved on 2007-11-04.
45. ^ Kummeling et al., "Consumption of organic foods and risk of atopic disease during the first 2 years of life in the Netherlands", *British Journal of Nutrition* (2007)
46. ^ FiBL Food quality: Clear benefits of organic products
47. ^ [2]
48. ^ Nutrition: Another Benefit Is Seen in Buying Organic Produce
49. ^ A comparative study of composition and postharvest performance of organically and conventionally grown kiwifruits, ScienceDaily article
50. ^ Luis Herrera-Estrella, Ariel Alvarez-Morales (April 2001). *Genetically modified crops: hope for developing countries?*. **2**. The EMBO journal. pp. 256–258. http://www.nature.com/embor/journal/v2/n4/full/embor436.html.
51. ^ Pamela Ronald, Raoul Admachak (April 2008). *Tomorrow's Table: Organic Farming, Genetics and the Future of Food*. Oxford University Press. http://www.amazon.com/Tomorrows-Table-Organic-Farming-Genetics/dp/0195301757.
52. ^ Seattle PI (2008). The lowdown on topsoil: it's disappearing
53. ^ "No Shortcuts in Checking Soil Health". USDA ARS. http://www.ars.usda.gov/is/AR/archive/jul07/soil0707.htm. Retrieved on 2007-10-02.
54. ^ LaSalle, Tim J, and Paul Hepperly. Regenerative Organic Farming: A Solution to Global Warming. 2008. Rodale Institute. 14 Feb. 2009 <http://www.rodaleinstitute.org//_Research_Paper-07_30_08.pdf>. AND Hepperly, Paul, Jeff Moyer, and Dave Wilson. "Developments in Organic No-till Agriculture." Acres USA: The Voice of Eco-agriculture Sept. 2008: 16-19. And Roberts, Paul. "The End of Food: Investigating a Global Crisis " Interview with Acres USA. Acres USA: The Voice of Eco-Agriculture Oct. 2008: 56-63.
55. ^ Meleca (2008). The Organic Answer to Climate Change.
56. ^ "Forecasting Agriculturally Driven Global Climate Change". 2006-03-21. http://www.sciencemag.org/cgi/content/abstract/292/5515/281?ijkey=bbb4cf6e526430899ecae63af4bbd319d226922e&keytype2=tf_ipsecsha. Retrieved on 2007-09-30.
57. ^ "Reduced nitrate leaching and enhanced denitrifier activity and efficiency in organically fertilized soils". Proceedings of the National Academy of Sciences. 2006-03-21. http://www.pnas.org/cgi/content/full/103/12/4522#B2. Retrieved on 2007-09-30.
58. ^ Yoon, Carol Kaesuk (January 20, 1998). "A "Dead Zone" Grows in the Gulf of Mexico". New York Times. http://query.nytimes.com/gst/fullpage.html?res=9B04E1DD1338F933A15752C0A96E958260&sec=&spon=&pagewanted=2. Retrieved on 2007-11-04.
59. ^ "Environmental impact and macro-economic feasibility of organic agriculture in the Danube River

Basin". Proceedings of the 13th International IFOAM Conference, p. 160-163. 2000. http://books.google.com/books?id=2hdlIfMhR8UC&pg=PA160&lpg=PA160&dq=znaor+kieft+%22environmental+impact+and+macro+economic+feasibility+of+organic+agriculture%22&source=web&ots=iUVpmgroc7&sig=zSNbPm2-Asz8LN2xZc3ADmCP00Q#PPA162,M1. Retrieved on 2007-11-04.

60. ^ Beman, M. (March 2005). "Agricultural runoff fuels large phytoplankton blooms in vulnerable areas of the ocean" (PDF). *Nature* 25(2). http://yaquivalley.stanford.edu/pdf/NATURE_3_10_05.pdf. Retrieved on 2007-11-04.
61. ^ Hole DG et al. (2005). "Does organic farming benefit biodiversity?". *Biological Conservation* **122** (1): 113–130. doi:10.1016/j.biocon.2004.07.018. http://www.botanischergarten.ch/Organic/Hole-Organic-biodiversity-2004.pdf.
62. ^ Hole et al. 2006
63. ^ *a b* Gabriel and Tscharntke 2006
64. ^ Bengtsson, Ahnstrom, and Weibull 2005
65. ^ van Elsen 2006
66. ^ Hole et al. 2005
67. ^ *a b* Fließbach et al. 2006
68. ^ Perrings et al. 2006
69. ^ Ingram 2007
70. ^ CNN. Consumer surveys show slipping interest in organic products, WSL Survey, The Hartman Group Organic Marketplace Reports.
71. ^ Howard, Phil. (2007) Organic Industry Graphics
72. ^ Corp Watch. (2004). Clouds on the Organic Horizon
73. ^ Farmers' Market Growth 1994-2006
74. ^ "ICapacity Building Study 3: Organic Agriculture and Food Security in East Africa" (PDF). University of Essex. http://www.unep-unctad.org/cbtf/events/dsalaam2/Organic%20Agriculture%20and%20Food%20Security%20in%20East%20Africa%20FINAL%20May07.pdf.
75. ^ Andrew Leonard. "Save the rain forest — boycott organic?". *How The World Works*. http://www.salon.com/tech/htww/2006/12/11/borlaug/. Retrieved on 2007-10-10.
76. ^ Anthony Trewavas (March 2001). "Urban myths of organic farming". *Nature* 410: 409-410. http://www.nature.com/nature/journal/v410/n6827/full/410409a0.html.
77. ^ The Bichel Committee.
78. ^ Avery, Alex (2007), "'Organic abundance' report: fatally flawed — Commentary", *Renewable Agriculture and Food Systems* (Cambridge: Cambridge University Press) **22** (4): 321–323, http://journals.cambridge.org/action/displayJournal?jid=RAF
79. ^ Bob Goldberg. "The Hypocrisy of Organic Farmers". http://www.agbioworld.org/biotech-info/articles/biotech-art/hypocrisy.html. Retrieved on 2007-10-10.
80. ^ *a b* "Wer hat die laengste Biochionase" (PDF). Bio-aktuell. http://www.bioaktuell.ch/fileadmin/documents/ba/zeitschrift/aktuelle_artikel/bioaktuell-2007-09-s8.pdf.
81. ^ "Organic Produce Production and Food Safety". UC Davis Cooperative Extension. http://vric.ucdavis.edu/veginfo/foodsafety/organicproduce.html.
82. ^ Marian Burros. "EATING WELL; Anti-Organic, And Flawed". http://query.nytimes.com/gst/fullpage.html?res=9503EFD8103AF934A25751C0A96F958260. Retrieved on 2007-12-14.
83. ^ New Zealand's Ministry of Agriculture and Forestry. "A Review of the Environmental/Public Good Costs and Benefits of Organic Farming and an Assessment of How Far These Can be Incorporated into Marketable Benefits". http://www.maf.govt.nz/mafnet/rural-nz/sustainable-resource-use/organic-production/organic-farming-in-nz/org10005.htm. Retrieved on 2008-04-20.
84. ^ LaSalle, T. and P. Hepperly (2008). Regenerative Organic Farming: A Solution to Global Warming. Rodale Institute.

References

- Lotter, D. (2003) Organic Agriculture. *Journal of Sustainable Agriculture* 21(4)
- Kuepper, George and Gegner, Lance. "Organic Crop Production Overview", ATTRA — National Sustainable Agriculture Information Service: August 2004.
- Emsley, John (April 2001). "Going One Better Than Nature". *Nature* **410**: 633–634. doi:10.1038/35070632.
- Paull, John (2006). "The Farm as Organism: The Foundational Idea of Organic Agriculture". *Journal*

of Bio-Dynamics Tasmania **83**: 14–18. http://orgprints.org/10138.
- Smil, Vaclav (2001). *Enriching the Earth: Fritz Haber, Carl Bosch, and the Transformation of World Food*. MIT Press.
- van Elsen, T., (2000) Species diversity as a task for organic agriculture in Europe. Agriculture, Ecosystems and Environment 77: 101-109
- Hole, D.G., Perkins, A.J., Wilson, J.D. Alexander, I.H., Grice, P.V. and Evans, A.D. (2005). *Does organic farming benefit biodiversity?* Biological Conservation 122: 113-130.
- Gabriel, D., and Tscharntke, T. (2007) Insect pollinated plants benefit from organic farming. Agriculture, Ecosystems and Environment 118: 43-48
- Bengtsston, J., Ahnstrom, J., Weibull, A. (2005). The effects of organic agriculture on biodiversity and abundance: a meta-analysis. Journal of Applied Ecology 42: 261-269
- Perrings et al. (2006) Biodiversity in Agricultural Landscapes: Saving Natural Capital without Losing Interest. Conservation Biology 20: 263-264
- Beecher N.A. et al. (2002) Agroecology of Birds in Organic and Nonorganic Farmland. Conservation Biology 6: 1621-1630
- Brown, R.W., 1999b. Margin/field interfaces and small mammals. Aspects of Applied Biology 54, 203–210.
- Wickramasinghe, L.P., Harris, S., Jones, G., Vaughan, N., 2003. Bat activity and species richness on organic and conventional farms: impact of agricultural intensification. Journal of Applied Ecology 40, 984–993.
- Wheeler S.A. (2008) What influences agricultural professionals' views towards organic agriculture? Ecological Economics 65:145-154
- Ingram M. (2007) Biology and Beyond: The Science of "Back to Nature" Farming in the United States. Annals of the Association of American Geographers 97:298-312
- Fließbach A., Oberholzer H., Gunst L., and Mäder P. (2006). Soil organic matter and biological soil quality indicators after 21 years of organic and conventional farming. Agriculture, Ecosystems and Environment 118: 273-284
- Willer, Helga and Kilcher Lukas (Eds.) (2009): The World of Organic Agriculture. Statistics and Emerging Trends 2009. IFOAM, Bonn; FiBL, Frick; ITC, Geneva. More information is available at the organic world hompage

Further reading

- Tomorrow's Table: Organic Farming, Genetics and the Future of Food. (2008). *[4]*. Oxford University Press.
- Committee on the Role of Alternative Farming Methods in Modern Production Agriculture, National Research Council. (1989). *Alternative Agriculture*. National Academies Press.
- Gettelman, Elizabeth (2006-08-11). "Farmworkers to Farmers". *Mother Jones*. http://www.motherjones.com/news/update/2006/08/alba.html. Retrieved on 2007-08-07.-An innovative program in California trains mostly immigrant workers how to succeed as organic farmers.
- Julie Guthman, *Agrarian Dreams: The Paradox of Organic Farming in California*, Berkeley and London: University of California Press, 2004, ISBN 978-0-520-24094-0
- Alex Avery (2006) *The Truth About Organic Foods (Volume 1, Series 1)* Henderson Communications, L.L.C. ISBN 0978895207
- Lampkin & Padel. (1994). *The Economics of Organic Farming: An International Perspective*. Guildford: CAB International. ISBN 0-85198-911-X
- Ableman, Michael (April 1993). *From the Good Earth: A Celebration of Growing Food Around the World*. HNA Books. ISBN 0810925176.
- Ableman, Michael (1998). *On Good Land: The Autobiography of an Urban Farm*. San Francisco: Chronicle Books. ISBN 0811819213.
- OECD. (2003). *Organic Agriculture: Sustainability, Markets, and Policies*. CABI International. Free full-text.

External links

- Organic Farming at the Open Directory Project
- Organic Eprints Database of organic agriculture research papers
- Organic Farming - European Commission
- National Sustainable Agriculture Information Service
- Food and Agriculture Organization of the United Nations' Organic Agriculture Program
- Organic Production and Organic Food: Information Access Tools. Identifies sources to research on organic agriculture topics from the Alternative Farming Systems Information Center, National Agricultural Library.
- Journal of Organic Systems Journal of Organic Systems
- Organic World homepage Information on organic agriculture worldwide.
- Organic Europe homepage Information on organic agriculture in Europe, including country reports, addresses and background information.
- Teaching Materials for Organic Farming in Africa Posters about organic farming from Uganda
- Organic Agriculture Information from the eOrganic Community of Practice with eXtension - Information from America's Land Grant University System and Partners

Retrieved from "http://en.wikipedia.org/wiki/Organic_farming"
Categories: Organic farming | Sustainable technologies | Organic food
Hidden categories: All articles with unsourced statements | Articles with unsourced statements from February 2009

Exhibit B

II. IFOAM Basic Standards

for

Organic Production and Processing

approved by the IFOAM General Assembly,
Victoria, Canada, August 2002

Changes in IFOAM Basic Standards (IBS) 2002

The revisions achieved in this round address the content, structure and consistency of the standards. It includes changes to the standards and to draft standards and major changes to the organization of the document.

- There is a new structure to the document. It is now written mainly in the active voice. The active voice makes it much more clear which party is responsible for each action.

- The chapters have been reorganized into a new, and more logical order. The organization now follows this sequence
  - Section A: General Principles
  - Section B: Standards, beginning with general principles and then ecosystem management, plant production and animal husbandry
  - Section C: Appendices. Includes inputs to organic agriculture, food additives and processing aids plus criteria for adding new inputs and additives.
  - Section D: Draft standards/appendix. Includes plant breeding and multiplication, aquaculture, cleaning, disinfecting and sanitizing, processing of textiles and forest management.

- Some parts of the text have been removed because they relate more to criteria for accreditation than to standards. Some parts of the document have been restructured into a chapter on ecosystem management

- The SC has gathered all references to GMOs into one chapter (ecosystem management). The intention is to make the policy toward GMOs consistent and comprehensive, and to avoid the problems of contradictory or uneven treatment by mentioning them in some sections but not in others.

- The Section on Bee keeping has been extensively revised.

- The Chapter on Social Justice has been rewritten.

- The Chapter on Processed Product has been restructured and revised to clarify what is required of organic processed products.

- A new Draft Chapter, "Plant Breeding and Propagation" and a corresponding Appendix has been added.

- In Appendix 1, 2 and 4 some of the materials have been explicitly restricted and others not. The restrictions that apply within the Standards are now identified in the Introduction to the Appendices. Additional restrictions in the input (materials) lists are provided where there is need to bring attention to specific concerns about the use of that material. The SC has proposed additional restrictions for a few materials.

Table of Contents

SECTION A GENERAL

Scope of the IFOAM Basic Standards

Organic agriculture [also known as "Biological" or "Ecological" agriculture or protected equivalent forms of these words (in other languages)] is a whole system approach based upon a set of processes resulting in a sustainable ecosystem, safe food, good nutrition, animal welfare and social justice. Organic production therefore is more than a system of production that includes or excludes certain inputs.

The IFOAM Basic Standards provide a framework for certification bodies and standard-setting organizations worldwide to develop their own certification standards and cannot be used for certification on their own. Certification standards should take into account specific local conditions and provide more specific requirements than the IFOAM Basic Standards.

Producers and processors that sell organic products are expected to be certified by certification bodies, using standards that meet or exceed the requirements of the IBS. This requires a system of regular inspection and certification designed to ensure the credibility of organically certified products and build consumer trust.

The IBS reflect the current state of organic production and processing methods. These Standards should not be seen as a final statement, but rather as a work in progress to contribute to the continued development and adoption of organic practices throughout the world.

Relevance to Accreditation and International Reference

The IBS and the IFOAM Accreditation Criteria are used by the International Organic Accreditation Service (IOAS) in the accreditation process for certification bodies and standards setting organizations. The IOAS compares the standards (used by the certifier) against the IBS and certification body performance against the IFOAM Accreditation Criteria.

All the requirements of the IBS relevant to the farming or processing operations certified must be implemented by IFOAM Accredited Certification Bodies.

IFOAM Basic Standards are also used by non accredited certification and standard-setting organizations as a reference for setting their standards.

Structure

The IFOAM Basic Standards are presented as **General Principles, Recommendations, Basic Standards and Derogations.**

- **General Principles** are the intended goals of organic production and processing. The principles are written as positive statements, using words such as "is" or "are". For example "Organic livestock husbandry is based on the harmonious relationship between land, plants, and livestock; respect for the physiological and behavioral needs of livestock and feeding of good-quality organically grown feedstuffs".
- **Recommendations** are practical suggestions for operators to implement in organic farm, food, and fiber systems. IFOAM promotes the recommendations as desirable practices, but does not require operators to use them. They are written with the word "should". For example "Handlers and processors should identify and avoid pollution and potential contamination sources."
- **Basic Standards** are the minimum requirements that an operation must meet to be certified organic. All of the Standards applicable to the particular farm and enterprise must be met before the operation may be certified as organic. Basic Standards use "shall". For example "All ruminants shall

have daily access to roughage".

- **Derogations** are the exceptions made to specific sections of the Basic Standards that may only be applied under clearly defined conditions. Derogations are presented in *italic* text.

Technical terms are explained in the section on definitions below.

Note: Certification bodies sometimes set their own standards, or they may adopt standards set by other organizations. For convenience throughout the text, we have written standard-setting organization, where we mean both the standard-setting organization and the certification body.

Draft Standards. New standards previously not covered by the IBS shall be called Draft Standards, to enable standard-setting organizations to develop ways of adapting them to local conditions before final adoption.

Certification bodies are not obliged to follow Draft Standards, however they are encouraged to use them to guide the development of their own standards.

Revision of Draft standards follows the Procedure for revision of standards.

Definitions

Accreditation
Procedure by which an authoritative body gives a formal recognition that a body or person is competent to carry out specific tasks

Ayurvedic
Traditional Indian system of medicine.

Biodiversity
The variety of life forms and ecosystem types on Earth. Includes genetic diversity (i.e. diversity within species), species diversity (i.e. the number and variety of species) and ecosystem diversity (total number of ecosystem types).

Breeding
Selection of plants or animals to reproduce and / or to further develop desired characteristics in succeeding generations.

Buffer zone
A clearly defined and identifiable boundary area bordering an organic production site that is established to limit application of, or contact with, prohibited substances from an adjacent area.

Certification
The procedure by which a third party gives written assurance that a clearly identified process has been methodically assessed, such that adequate confidence is provided that specified products conform to specified requirements.

Certification body
The body that conducts certification, as distinct from standard-setting and inspection.

Certification mark
A certification body's sign, symbol or logo that identifies product(s) as being certified according to the rules of a program operated by that certification body.

Certification program
System operated by a certification body with its own rules, procedures and management for carrying out certification of conformity.

Contamination
Pollution of organic product or land; or contact with any material that would render the product unsuitable for organic certification.

Conventional
Conventional means any material, production or processing practice that is not certified organic or organic "in-conversion".

Conversion period
The time between the start of the organic management and the certification of crops and animal husbandry as organic.

Crop rotation
The practice of alternating the species or families of annual and/or biennial crops grown on a specific field in a planned pattern or sequence so as to break weed, pest and disease cycles and to maintain or improve soil fertility and organic matter content.

Culture
A micro-organism, tissue, or organ, growing on or in a medium.

Direct source organism
The specific plant, animal, or microbe that produces a given input or ingredient, or that gives rise to a secondary or indirect organism that produces an input or ingredient.

Disinfect
To reduce, by physical or chemical means, the number of potentially harmful micro-organisms in the environment, to a level that does not compromise food safety or suitability.

Exception
Permission granted to an operator by a certification body to be excluded from the need to comply with normal requirements of the standards. Exceptions are granted on the basis of clear criteria, with clear justification and for a limited time period only.

Farm unit
The total area of land under control of one farmer or collective of farmers, and including all the farming activities or enterprises.

Food additive
An enrichment, supplement or other substance which can be added to a foodstuff to affect its keeping quality, consistency, color, taste, smell or other technical property (For full definition, see Codex Alimentarius).

Genetic diversity
Genetic diversity means the variability among living organisms from agricultural, forest and aquatic ecosystems; this includes diversity within species and between species.

Genetic engineering
Genetic engineering is a set of techniques from molecular biology (such as recombinant DNA) by which the genetic material of plants, animals, micro-organisms, cells and other biological units are altered in ways or with results that could not be obtained by methods of natural mating and reproduction or natural

recombination. Techniques of genetic modification include, but are not limited to: recombinant DNA, cell fusion, micro and macro injection, encapsulation, gene deletion and doubling. Genetically engineered organisms do not include organisms resulting from techniques such as conjugation, transduction and natural hybridization.

Genetically Modified Organism (GMO)
A plant, animal, or microbe that is transformed by genetic engineering.

Genetic resources
Genetic resources means genetic material of actual or potential value.

Green manure
A crop that is incorporated into the soil for the purpose of soil improvement. May include spontaneous crops, plants or weeds.

Habitat
The area over which a plant or animal species naturally exists; the area where a species occurs. Also used to indicate types of habitat, e.g. seashore, riverbank, woodland, grassland.

HACCP
Hazard Analysis and Critical Control Point. A specific food safety program to identify contamination risks and actions to prevent exposure to such risks.

Homeopathic treatment
Treatment of disease based on administration of remedies prepared through successive dilutions of a substance that in larger amounts produces symptoms in healthy subjects similar to those of the disease itself.

Ingredient
Any substance, including a food additive, used in the manufacture or preparation of a food or present in the final product although possibly in a modified form.

Irradiation (ionizing radiation)
High energy emissions from radio-nucleotides, capable of altering a food's molecular structure for the purpose of controlling microbial contaminants, pathogens, parasites and pests in food, preserving food or inhibiting physiological processes such as sprouting or ripening.

Labeling
Any written, printed or graphic representation that is present on the label of a product, accompanies the product, or is displayed near the product.

Media (plural) or medium (singular)
The substance in which an organism, tissue, or organ exists.

Multiplication
The growing on of seed stock or plant material to increase supply for future planting.

Natural fiber
A non-synthetic filament of plant or animal origin.

Operator
An individual or business enterprise, responsible for ensuring that products meet the certification requirements.

Organic
"Organic" refers to the farming system and products described in the IFOAM Basic Standards and not to "organic chemistry"

Organic product
A product which has been produced, processed, and/or handled in compliance with organic standards.

Organic seed and plant material
Seed and planting material that is produced under certified organic management

Parallel production
Any production where the same unit is growing, breeding, handling or processing the same products in both a certified organic system and a non-certified or non-organic system. A situation with "organic" and "in conversion" production of the same product is also parallel production. Parallel production is a special instance of split production.

Processing aid
Any substance or material, not including apparatus or utensils, and not consumed as a food ingredient by itself, intentionally used in the processing of raw materials, foods or its ingredients, to fulfill a certain technical purpose during treatment or processing and which may result in the non-intentional, but unavoidable presence of residues or derivatives in the final product.

Propagation
The reproduction of plants by sexual (i.e. seed) or asexual (i.e. cuttings, root division) means.

Sanitize
To adequately treat produce or food-contact surfaces by a process that is effective in destroying or substantially reducing the numbers of vegetative cells of microorganisms of public health concern, and other undesirable microorganisms, but without adversely affecting the product or its safety for the consumer.

Split production
Where only part of the farm or processing unit is certified as organic. The remainder of the property can be (a) non-organic, (b) in conversion or (c) organic but not certified. Also see parallel production.

Synthetic
Manufactured by chemical and industrial processes. May include products not found in nature, or simulation of products from natural sources (but not extracted from natural raw materials).

SECTION B GENERAL PRINCIPLES, RECOMMENDATIONS AND STANDARDS

Note: Revisions to Section B, Chapter 1 are voted by the IFOAM General Assembly, and are not subject to the standard IBS revision procedure.

1. The Principal Aims of Organic Production and Processing

Organic Production and Processing is based on a number of principles and ideas. All are important and this list does not seek to establish any priority of importance. The principles include:

- To produce sufficient quantities of high quality food, fiber and other products.
- To work compatibly with natural cycles and living systems through the soil, plants and animals in the entire production system.
- To recognize the wider social and ecological impact of and within the organic production and processing system.
- To maintain and increase long-term fertility and biological activity of soils using locally adapted cultural, biological and mechanical methods as opposed to reliance on inputs.
- To maintain and encourage agricultural and natural biodiversity on the farm and surrounds through the use of sustainable production systems and the protection of plant and wildlife habitats.
- To maintain and conserve genetic diversity through attention to on-farm management of genetic resources.
- To promote the responsible use and conservation of water and all life therein.
- To use, as far as possible, renewable resources in production and processing systems and avoid pollution and waste.
- To foster local and regional production and distribution.
- To create a harmonious balance between crop production and animal husbandry.
- To provide living conditions that allow animals to express the basic aspects of their innate behavior
- To utilize biodegradable, recyclable and recycled packaging materials.
- To provide everyone involved in organic farming and processing with a quality of life that satisfies their basic needs, within a safe, secure and healthy working environment.
- To support the establishment of an entire production, processing and distribution chain which is both socially just and ecologically responsible.
- To recognize the importance of, and protect and learn from, indigenous knowledge and traditional farming systems.

2. Organic Ecosystems

2.1. Ecosystem Management

General Principle
Organic farming benefits the quality of ecosystems.

Recommendations
Operators should maintain a significant portion of their farms to facilitate biodiversity and nature conservation.

A farm should place appropriate areas under its management in wildlife refuge habitat. These include:
extensive grassland such as moorlands, reed land or dry land

- in general all areas which are not under rotation and are not heavily manured: extensive pastures, meadows, extensive grassland, extensive orchards, hedges, hedgerows, edges between agriculture and forest land, groups of trees and/or bushes, and forest and woodland
- ecologically rich fallow land or arable land
- ecologically diversified (extensive) field margins
- waterways, pools, springs, ditches, floodplains, wetlands, swamps and other water rich areas which are not used for intensive agriculture or aquaculture production
- areas with ruderal flora
- wildlife corridors that provide linkages and connectivity to native habitat.

Standards shall require that:

2.1.1.
Operators shall take measures to maintain and improve landscape and enhance biodiversity quality.

2.1.2.
Clearing of primary ecosystems is prohibited.

2.2. Soil and Water Conservation

General Principle
Organic farming methods conserve and grow soil, maintain water quality and use water efficiently and responsibly.

Recommendations
Operators should minimize loss of topsoil through minimal tillage, contour plowing, crop selection, maintenance of soil plant cover and other management practices that conserve soil.

Operators should take measures to prevent erosion, compaction, salination, and other forms of soil degradation.

Operators should use techniques that conserve water, such as increasing organic matter content of soil, timing of planting and the appropriate design, efficiency and scheduling of irrigation practices.

Operators should apply water and inputs in a way that does not pollute water by runoff to surface water or leaching into ground water.

Organic processors and handlers should install systems that permit the responsible use and recycling of

water without pollution or contamination either by chemicals, or by animal or human pathogens.

Operators should plan and design systems that use water resources responsibly and in a manner appropriate to local climate and geography.

Organic management plans should anticipate, address, and mitigate impacts on water resources, including but not limited to the application of manure, stocking densities, application of soluble fertilizers, and effluent from processing and handling facilities.

Operators should respect sustainable resource management and the common good.

Standards shall require that:

2.2.1.
All operators shall take defined and appropriate measures to prevent erosion.

2.2.2.
Land preparation by burning vegetation shall be restricted to the minimum.

2.2.3.
Crop production, processing and handling systems shall return nutrients, organic matter and other resources removed from the soil through harvesting by the recycling, regeneration and addition of organic materials and nutrients.

2.2.4.
Grazing management shall not degrade land or pollute water resources.

2.2.5.
Relevant measures shall be taken to prevent or remedy soil and water salinisation.

2.2.6.
Operators shall not deplete nor excessively exploit water resources, and shall seek to preserve water quality. They shall where possible recycle rainwater and monitor water extraction.

2.3. Genetic Engineering

General Principle
Genetic engineering is excluded from organic production and processing

Recommendation
Genetically Modified Organisms (GMOs) and their derivatives should be excluded from organic production processing and handling to the fullest extent possible.

Standards shall require that:

2.3.1.
The deliberate use or negligent introduction of genetically engineered organisms or their derivatives to organic farming systems or products is prohibited. This shall include animals, seed, propagation material, and farm inputs such as fertilizers, soil conditioners, vaccines or crop protection materials.

2.3.2.
The use of genetically engineered organisms or their derivatives is prohibited. This shall include animals, seed and farm inputs such as fertilizers, soil conditioners, vaccines or crop protection materials.

2.3.3.
The use of genetically engineered seeds, pollen, transgene plants or plant material is not allowed.

2.3.4.
Organic processed products shall not use ingredients, additives or processing aids derived from GMOs.

2.3.5.
Inputs, processing aids and ingredients shall be traced back one step in the biological chain to the direct source organism *(see definition) from which they are produced to verify that they are not derived from GMOs.

2.3.6.
Contamination of organic product by GMOs that results from circumstances beyond the control of the operator may alter the organic status of the operation and/ or product.

2.3.7.
On farms with split (including parallel) production the use of genetically engineered organisms is not permitted in any production activity on the farm.

2.4. Wild harvested products and common/public land management

General Principle
Organic management sustains and prevents degradation of common biotic and abiotic resources, including areas used for rangeland, fisheries, forests, and forage for bees, as well as neighboring land, air, and water.

Recommendations
The operator should provide for maintenance and sustainability of the ecosystem when harvesting or gathering the products.

The operator should positively contribute to the maintenance of natural areas.

Standards shall require that:

2.4.1.
Wild harvested products shall only be certified organic if they are derived from a stable and sustainable growing environment. The people who harvest, gather, or wildcraft shall not take any products at a rate that exceeds the sustainable yield of the ecosystem, or threaten the existence of plant, fungal or animal species, including those not directly exploited.

2.4.2.
Operators shall harvest products only from a clearly defined area where prohibited substances have not been applied.

2.4.3.
The collection or harvest area shall be at an appropriate distance from conventional farming, pollution and contamination.

2.4.4.
The operator who manages the harvesting or gathering of common resource products shall be familiar with the defined collecting area.

3. *General Requirements for Crop Production and Animal Husbandry*

3.1. Conversion Requirements

General Principle
Organic agriculture develops a viable and sustainable agro-ecosystem, by working compatibly with natural living systems and cycles.

Recommendations
For optimum sustainability of an agro-ecosystem, all activities including crop production, animal husbandry and general environmental maintenance should be organized such that all the elements of the farm activities interact positively. Practical farming skills, based on knowledge, observation and experience are therefore important for organic growers. Careful practice based on skill and knowledge often avoids the requirement for synthetic inputs, and reduces reliance on inputs.

Conversion may be accomplished over a period of time. A farm may be converted by gradual introduction of organic practices over the whole farm, or by application of organic principles to only a portion of the operation at first.

There should be a clear plan of how to proceed with the conversion. This plan should be updated as necessary and cover all aspects relevant to these standards. The plan should indicate that the totality of crop production and animal production in the operation will be converted to organic management.

Standards should determine how organic and non-organic production and product can be clearly separated and distinguishable in production and documentation, to prevent unintentional mixing of inputs and products.

Independent sections of the operation unit should be converted in such a way that these standards are completely met on each section before it is certified as organic.

Standards shall require that:

3.1.1.
There shall be a period of organic management, meeting all the requirements of these standards, before the resulting product may be considered as organic.

3.1.2.
The start of the conversion period shall be calculated from the date of application to the certification body or, alternatively, from the date of the last application of unapproved inputs providing the operator can demonstrate that the full standards requirements have been met for at least the minimum period stated in 4.2 and 5.2. Calculation of the conversion period may not start before the date of the last non-compliant input or practice. For the length of conversion periods, refer to sections 4.2. and 5.2.

3.2. Split Production and Parallel Production

General Principle
The whole farm, including livestock, is converted to organic management practices according to the standards over a period of time.

Recommendation
The operator should convert the whole farm, and the conversion plan should include the steps and approximate time-frame for whole farm conversion.

Standards shall require that:

3.2.1.
If the whole farm is not converted (split production) the organic and conventional parts of the farm shall be clearly and continuously separate and this shall be verified by inspection.

3.2.2.
Simultaneous production of the same organic and non-organic crops or animal products (parallel production) is only permitted where such production is undertaken in a way that allows clear and continuous separation of all product claimed as certified or certifiable as organic.

3.3. Maintenance of Organic Management

General Principle
Organic production systems require an ongoing commitment to organic production practices.

Recommendation
The operator should design an organic conversion management plan that includes programs and strategies that will allow the operation to be sustainably maintained as organic.

Standards shall require that:

3.3.1.
The operator shall demonstrate that a production system does not rely upon continuous switching between organic and conventional management.

4. Crop Production

4.1. Choice of Crops and Varieties

General Principle
Species and varieties cultivated in organic agriculture systems are selected for adaptability to the local soil and climatic conditions and tolerance to pests and diseases.
All seeds and plant material are certified organic.

Recommendations
A wide range of crops and varieties should be grown to enhance the sustainability, self-reliance and biodiversity value of organic farms.

Plant varieties should be selected to maintain genetic diversity.

Organically grown varieties, and varieties known to be suited to organic cultivation should be preferred.

Operators should use organically bred varieties. See Chapter 9 and Appendix 6 for the draft organic plant breeding and multiplication standards.

Standards shall require that:

4.1.1.
Organic seed and plant materials of appropriate varieties and quality shall be used. When they are not commercially available, standard-setting organizations shall set time limits for the use of non-organic seed and plant material.

4.1.2.
When organic seed and plant materials are not available, conventional materials may be used provided that they have not been treated with pesticides not otherwise permitted by these standards.

Where untreated conventional seeds and plant materials are not available, chemically treated seed and plant material may be used. The certification body shall establish time limits and conditions for exemptions that permit use of any chemically treated seeds and plant materials.

4.2. Length of Conversion Period (Plant Production)

General Principle
A conversion period enables the establishment of an organic management system and builds soil fertility.

Recommendations
The conversion period should be long enough to improve soil fertility significantly and to re-establish the balance of the ecosystem.

The length of the conversion period should be adapted to:
- the past use of the land
- the ecological context and its implications
- the experience of the operator.

The length of the conversion period should be defined to provide for a period of at least 36 months from the last date of application of any prohibited material or practice.

Standards shall require that:

4.2.1.
Plant products from annual production shall only be considered organic when a conversion period of at least 12 months has elapsed prior to the start of the production cycle. In the case of perennials (excluding pastures and meadows) a period of at least 18 months prior to harvest shall be required.

4.2.2.
There shall be at least a 12-month conversion period prior to pastures, meadows and products harvested therefrom, being considered organic.

4.2.3.
The conversion period may be extended by the standard-setting organization depending on conditions such as past use of the land, management capacity of the operator and environmental factors.

4.2.4.
Where conversion periods exceeding those stated in 4.2.1 are required, and labeling of product as "produce of organic agriculture in the process of conversion" or a similar description is permitted, the standards requirements shall have been met for at least 12 months prior to such labeling.

4.3. Diversity in Crop Production

General Principle
Soil and soil management is the foundation of organic production. Organic growing systems are soil based, care for the soil and surrounding ecosystems and provide support for a diversity of species, while encouraging nutrient cycling and mitigating soil and nutrient losses.

Recommendations
Diversity in crop production is achieved by a combination of:
- a diverse and versatile crop rotation that includes green manure, legumes and deep rooting plants
- appropriate coverage of the soil with diverse plant species for as much of the year as possible.

Standards shall require that:

4.3.1.
Diversity in plant production and activity shall be assured by minimum crop rotation requirements and/or variety of plantings. Minimum rotation practices for annual crops shall be established unless the operator demonstrates diversity in plant production by other means. Operators are required to manage pressure from insects, weeds, diseases and other pests, while maintaining or increasing soil organic matter, fertility, microbial activity and general soil health.

4.3.2.
For perennial crops, the certifying body shall set minimum standards for orchard/plantation floor cover and/or diversity or refuge plantings in the orchard.

4.4. Soil Fertility and Fertilization

General Principle

Organic farming returns microbial plant or animal material to the soil to increase or at least maintain its fertility and biological activity.

Recommendations

Biodegradable material of microbial, plant or animal origin produced from organic practices should form the basis of the fertility program.
Nutrient resources should be used in a sustainable and responsible manner. Nutrient losses from the farm to the natural environment should be minimized. Nutrients should be used in such a way and at appropriate times and places to optimize their effect.

Accumulation of heavy metals and other pollutants should be prevented.

Naturally occurring mineral fertilizers and brought-in fertilizers of biological origin permitted under these standards should be regarded as only one component of the nutrient system, and as a supplement to, and not a replacement for, nutrient recycling.
Manures containing human feces and urine should not be used unless free of human pathogens. Careful attention to hygiene is required and it is recommended that they are not applied directly to vegetation for human consumption or to soil that will be used to grow annual plants within the next six months.

Standards shall require that:

4.4.1.
Material of microbial, plant or animal origin shall form the basis of the fertility program.

4.4.2.
Nutrients and fertility products shall be applied in a way that protects soil, water, and biodiversity. Restrictions may be based on amounts, location, timing, treatments, methods, or choice of inputs applied.

4.4.3.
Material applied to the land or crop shall be in accordance with Appendix 1.

4.4.4.
Manures containing human excrement (feces and urine) are prohibited for use on crops for human consumption.

Exceptions may be made where detailed sanitation requirements are established by the standard-setting organization to prevent the transmission of pests, parasites and infectious agents and to ensure that manures are not mixed with other household or industrial wastes that may contain prohibited substances.

4.4.5.
Mineral fertilizers shall only be used in a program addressing long-term fertility needs together with other techniques such as organic matter additions, green manures, rotations and nitrogen fixation by plants.

4.4.6.
Mineral fertilizers shall be applied in the form in which they are naturally composed and extracted and shall not be rendered more soluble by chemical treatment, other than addition of water and mixing with other naturally occurring, permitted inputs.

Under exceptional circumstances, and after consideration of all relevant information, and having regard to Appendix 3, the standard-setting organizations may grant exception to this requirement. These exceptions shall not apply to mineral fertilizers containing nitrogen.

4.4.7.
Chilean nitrate and all synthetic nitrogenous fertilizers, including urea, are prohibited

4.5. Pest, Disease, Weed, and Growth Management

General Principles

Organic farming systems apply biological and cultural means to prevent unacceptable losses from pests, diseases and weeds. They use crops and varieties that are well-adapted to the environment and a balanced fertility program to maintain fertile soils with high biological activity, locally adapted rotations, companion planting, green manures, and other recognized organic practices as described in these standards.

Growth and development should take place in a natural manner.

Recommendations

Pests, diseases and weeds should be managed by the knowledgeable application of one, or a combination, of the following measures:

- choice of appropriate species and varieties
- appropriate rotation programs
- mechanical cultivation
- protection of natural enemies of pests through provision of favorable habitat, such as hedges, nesting sites and ecological buffer zones that maintain the original vegetation to house pest predators
- diversified ecosystems. These will vary between geographical locations. For example, buffer zones to counteract erosion, agro-forestry, rotating crops, intercropping etc.
- thermal weeding
- seed bed preparation
- natural enemies including release of predators and parasites
- acceptable biodynamic preparations from stone meal, farmyard manure or plants
- mulching and mowing
- grazing of animals
- mechanical controls such as traps, barriers, light and sound

Standards shall require that:

4.5.1.
All organic production systems shall display a set of positive processes/mechanisms capable of accounting for management of significant pests, weeds and diseases under normal circumstances.

4.5.2.
Pest, disease and weed management products that are prepared at the farm from local plants, animals and micro-organisms, are permitted when the measures in 4.5.1. are not sufficient. If the ecosystem or the quality of organic products might be jeopardized, the *Procedure to Evaluate Additional Inputs to Organic Agriculture (Appendix 3)* and other relevant criteria shall be used to establish whether the product is acceptable.

4.5.3.
Physical methods for pest, disease and weed management are permitted, including the application of heat. Thermal sterilization of soils to combat pests and diseases is restricted. The standard-setting organization shall establish standards or criteria for all soil sterilization methods that are considered consistent with Appendices 2 and 3.

4.5.4.
Any input applied for plant pest, disease, weed, or growth management shall appear in

Appendix 2 subject to the limitations of that Appendix.

4.5.5.
Any formulated input shall have only active ingredients in Appendix 2, and all other components shall meet the criteria of Appendix 3.
Formulated products with only active ingredients in Appendix 2, but with other components that have not been reviewed against the above criteria may be used until 2005.

4.6. Avoiding Contamination

General Principle
All relevant measures are taken to ensure that organic soil and food is protected from contamination.

Recommendations
Operators should take reasonable measures to identify and avoid potential contamination.

In case of risk, or reasonable suspicion of risk, that contamination may occur, the standard-setting organization should set limits for the maximum application levels of heavy metals and other pollutants. The standards should place emphasis on detection of contamination sources, improvement of the production system taking into account the procedures developed for HACCP, and the assessment of background contamination levels.

Accumulation of heavy metals and other pollutants should be limited and the appropriate remedial measures implemented where possible.

The standards should establish parameters for the acceptance/rejection of organic products based on analysis.
The standards should establish a procedure on how to evaluate organic products in case of reasonable suspicion of pollution based on due expert consideration and the precautionary principle.

Contamination that results from circumstances beyond the control of the operation does not necessarily alter the organic status of the operation.

Standards shall require that:

4.6.1.
The operator shall employ measures including barriers and buffer zones to avoid potential contamination and limit contaminants in organic products.

4.6.2.
In case of a reasonable suspicion of contamination the certification body shall ensure that an analysis of the relevant products and possible sources of pollution (soil, water, air and inputs) is undertaken to determine the level of contamination and shall make the appropriate responses, such as detection of contamination sources, considering background contamination and other relevant factors.

4.6.3.
For synthetic structure coverings, mulches, fleeces, insect netting and silage wrapping, only products based on polyethylene and polypropylene or other polycarbonates are permitted. These shall be removed from the soil after use and shall not be burned on the farmland.

4.6.4.
All equipment from conventional farming systems shall be thoroughly cleaned of potentially contaminating materials before being used on organically managed areas.

5. Animal Husbandry

5.1. Animal Management

General Principle
Organic livestock husbandry is based on the harmonious relationship between land, plants and livestock, respect for the physiological and behavioral needs of livestock and the feeding of good-quality organically grown feedstuffs.

Recommendations
The operator should:
- provide adequate good quality organically grown feedstuffs
- maintain appropriate stocking rates, flock or herd sizes, and rotations to allow for natural behavior patterns and to maintain natural resources and environmental quality
- practice methods of animal management that reduce stress, promote animal health and welfare, prevent disease and parasitism, and avoid the use of chemical allopathic veterinary drugs
- apply management practices that promote sustainable land and water use

Standards shall require that:

5.1.1.
The operator shall ensure that the environment, the facilities, stocking density and flock/herd size provides for the behavioral needs of the animals and provides for:
- sufficient free movement and opportunity to express normal patterns of behavior
- sufficient fresh air, water, feed and natural daylight to satisfy the needs of the animals
- access to resting areas, shelter and protection from sunlight, temperature, rain, mud and wind adequate to reduce animal stress
- the maintenance of social structures by ensuring that herd animals are not kept in isolation from other animals of the same species
- construction materials and production equipment that do not significantly harm human or animal health

This provision does not apply to small herds for mostly self-sufficient production. Operators may isolate male animals, sick animals and those about to give birth.

5.1.2.
Housing conditions shall ensure:
- ample access to fresh water and feed according to the needs of the animals
- animals have sufficient space to stand naturally, lie down easily, turn around, groom themselves and assume all natural postures and movements such as stretching, and wing flapping
- where animals require bedding, adequate natural materials are provided
- that construction provides for insulation, heating, cooling and ventilation of the building, that permits air circulation, dust levels, temperature, relative air humidity, and gas concentrations to within levels that are not harmful to the livestock
- that poultry, rabbits and pigs shall not be kept in cages
- that animals are protected from predation by wild and feral animals

5.1.3.
Landless animal husbandry systems are prohibited.

5.1.4.
All animals shall have access to pasture or an open-air exercise area or run, whenever the physiological condition of the animal, the weather and the state of the ground permit. Such areas may be partially covered.

Animals may be temporarily confined because of inclement weather or absences of pasture due to temporary or seasonal conditions. Such animals shall still have access to an outdoor run.
Animals may be fed with carried fresh fodder where this is a more sustainable way to use land resources than grazing. Animal welfare shall not be compromised.

5.1.5.
The maximum hours of artificial light used to prolong natural day length shall not exceed a maximum that respects the natural behavior, geographical conditions and general health of the animals.

5.2. Length of Conversion Period

General Principle
The establishment of organic animal husbandry requires an interim period, the conversion period.
Animal husbandry systems that change from conventional to organic production require a conversion period to develop natural behavior, immunity and metabolic functions.

Recommendations
All livestock on an organic farm should be converted to organic production. Conversion should be accomplished over a period of time.

Replacement poultry should be brought onto the holding at the start of the production cycle.

Standards shall require that:

5.2.1.
Animal products may be sold as "product of organic agriculture" only after the land and animals have all met the appropriate established conversion requirements

5.2.2.
Land and animals may be converted simultaneously subject to the requirements for all other land and animal conversion periods.

5.2.3.
Where existing animals on a farm are converted to organic they shall undergo a one-time minimum conversion period at least according to the following schedule:

Production	Conversion period
meat	12 months
dairy	90 days
eggs	42 days

5.3. Animals Sources/ Origin

General Principle
Organic animals are born and raised on organic holdings.

Recommendation
Organic animal husbandry should not be dependent on conventional raising systems.
Livestock obtained from off the farm should be from organic farms or as part of an established co-operative program between specific farms to improve herd heath and fitness.

Standards shall require that:

5.3.1.
Animals shall be raised organically from birth.

- *When organic livestock is not available conventional animals may be brought in according to the following age limits:2 day old chickens for meat production*
- *18 week old hens for egg production*
- *2 weeks for any other poultry*
- *piglets up to 6 weeks and after weaning*
- *dairy calves up to 4 weeks old that have received colostrum and are fed a diet consisting mainly of full milk.*

5.3.2.
Breeding stock may be brought in from conventional farms to a yearly maximum of 10% of the adult animals of the same species on the farm.

Where standards allow for exceptions of more than 10% these shall be limited to:

- *unforeseen severe natural or man made events*
- *considerable enlargement of the farm*
- *establishment of a new type of animal production on the farm*
- *holdings with less than 10 animals*

5.4. Breeds and Breeding

General Principle
Breeds are adapted to local conditions.

Recommendations
Breeding goals should encourage and maintain the good health and welfare of the animals consistent with their natural behavior.

Breeding practices should include methods that do not depend on high technologies invasive to natural behavior and capital intensive methods.

Animals should be bred by natural reproduction techniques.

Standards shall require that:

5.4.1.
Breeding systems shall be based on breeds that can reproduce successfully under natural conditions without human involvement.

5.4.2.
Artificial insemination is permitted.

5.4.3.
Embryo transfer techniques and cloning are prohibited.

5.4.4.
Hormones are prohibited to induce ovulation and birth unless applied to individual animals for medical reasons and under veterinary supervision.

5.5. Mutilations

General Principle
Organic farming respects the animal's distinctive characteristics.

Recommendations
Operators should select species and breeds that do not require mutilation.

Exceptions for mutilations should only be made when suffering can be kept to the minimum. Surgical treatments should only be used for reasons of safety, mitigation of suffering and the health and welfare of the livestock.

Standards shall require that:

5.5.1.
Mutilations are prohibited.

The following exceptions may be used only if animal suffering is minimized and anesthetics are used where appropriate:

- *castrations*
- *tail docking of lambs*
- *dehorning*
- *ringing*
- *mulesing only for breeds that require mulesing*

5.6. Animal Nutrition

General Principle
Organic animals receive their nutritional needs from organic forage and feed of good quality.

Recommendations
Operators should offer a balanced diet that provides all of the nutritional needs of the animals in a form allowing them to exhibit their natural feeding and digestive behavior.

Organic animals should be fed by-products from the organic food processing industry not suitable for human use.

Ruminants should receive a balanced diet according to their specific nutritional needs and should not be fed a diet that consists entirely of silage and concentrates.

All feed should come from the farm itself or be produced within the region.

Coloring agents in feed should not be used in organic livestock production.

All animals should have daily access to roughage.

Standards shall require that:

5.6.1.
Animals shall be fed organic feed.

Operators may feed a limited percentage of non-organic feed under specific conditions for a limited time in the following cases:

- *organic feed is of inadequate quantity or quality*
- *areas where organic agriculture is in early stages of development*

In no case may the percentage of non-organic feed exceed 10% dry matter per ruminant and 15% dry matter per non-ruminant calculated on an annual basis.

Operators may feed a limited percentage of non-organic feed under specific conditions for a limited time in the following cases:

- *unforeseen severe natural or man-made events*
- *extreme climatic or weather conditions*

5.6.2.
The prevailing part (at least more than 50%) of the feed shall come from the farm unit itself or be produced in co-operation with other organic farms in the region.

The standard-setting organization may allow exceptions with regard to local and regional conditions, and shall set a time limit.

5.6.3.
For the calculation of feeding allowances only, feed produced on the farm unit during the first year of organic management, may be classed as organic. This refers only to feed for animals that are being produced within the farm unit. Such feed may not be sold or otherwise marketed as organic.

5.6.4.
The following substances are prohibited in the diet:

- farm animal by-products (e.g. abattoir waste) to ruminants
- all types of excrements including droppings, dung or other manure (all types of excrements)
- feed subjected to solvent extraction (e.g. hexane) or the addition of other chemical agents
- amino-acid isolates
- urea and other synthetic nitrogen compounds
- synthetic growth promoters or stimulants
- synthetic appetizers
- preservatives, except when used as a processing aid
- artificial coloring agents

5.6.5.
Animals may be fed vitamins, trace elements and supplements from natural sources.

Synthetic vitamins, minerals and supplements may be used when natural sources are not available in sufficient quantity and quality.

5.6.6.
All ruminants shall have daily access to roughage.

5.6.7.
Fodder preservatives such as the following may be used:

- bacteria, fungi and enzymes
- by-products of food industry (e.g. molasses)
- plant based products

Synthetic chemical fodder preservatives such as acetic, formic and propionic acid and vitamins and mineral are permitted in severe weather conditions.

5.6.8.
Young stock from mammals shall be provided maternal milk or organic milk from their own species and shall be weaned only after a minimum time that takes into account the natural behavior of the relevant animal species.

Operators may provide non-organic milk when organic milk is not available.

Operators may provide milk replacers or other substitutes only in emergencies provided that they do not contain antibiotics, synthetic additives or slaughter products

5.7. Veterinary Medicine

General Principle
Organic management practices promote and maintain the health and well-being of animals through balanced organic nutrition, stress-free living conditions and breed selection for resistance to diseases, parasites and infections.

Recommendations
Operators should maintain animal health and practice disease prevention through the following techniques:

- selection of appropriate breeds or strains of animals
- adoption of animal husbandry practices appropriate to the requirements of each species, such as regular exercise and access to pasture and/or open-air runs, to encourage the natural immunological defense of animal to stimulate natural immunity and tolerance to diseases
- provision of good quality organic feed
- appropriate stocking densities
- grazing rotation and management

Operators should use natural medicines and treatments, including homeopathy, Ayurvedic medicine and acupuncture whenever appropriate.

When illness does occur an operator should determine the cause and prevent future outbreaks by adopting appropriate management practices.

Standards shall require that:

5.7.1.
The operator shall take all practical measures to ensure the health and well-being of the animals through preventative animal husbandry practices.

5.7.2.
If an animal becomes sick or injured despite preventative measures that animal shall be treated promptly and adequately, if necessary in isolation and in suitable housing. Producers shall not withhold medication where it will result in unnecessary suffering of the livestock, even if the use of such medication will cause the animal to lose its organic status.

An operator may use chemical allopathic veterinary drugs or antibiotics only if:

- *preventive and alternative practices are unlikely to be effective to cure sickness or injury*
- *they are used under the supervision of a veterinarian, and*
- *withholding periods shall be not less than double of that required by legislation, or a minimum of 48 hours, whichever is longer*

5.7.3.
Substances of synthetic origin used to stimulate production or suppress of natural growth are prohibited

5.7.4.
Vaccinations are allowed with the following limitations:

- when an endemic diseases is known or expected to be a problem in the region of the farm and where this diseases cannot be controlled by other management techniques; or
- when a vaccination is legally required. and
- the vaccine is not genetically engineered

5.8. Transport and Slaughter

General Principle
Organic animals are subjected to minimum stress during transport and slaughter.

Recommendations
Animals should be transported the minimum frequencies and distances possible.

Animals should be inspected regularly during transport.

The transportation medium should be appropriate for each animal.

Animals should be watered and fed during transport depending on weather and other conditions of transport.

Those responsible for transportation and slaughtering should employ stress-reducing measures, such as:
a. allowing sufficient rest time to reduce stress
b. maintaining existing group and social ties
c. avoiding contact (sight, sound or smell) of each live animal with dead animals or animals in the killing process.

Each animal should be stunned before being bled to death. The equipment used for stunning should be in good working order. Exceptions can be made according to cultural practice. Where animals are bled without prior stunning this should take place in a calm environment.

Local and mobile slaughterhouses should be used when available.

Standards shall require that:

5.8.1.
Animals be handled calmly and gently during transport and slaughter

5.8.2.
The use of electric prods and other such instruments is prohibited.

5.8.3.
Organic animals be provided with conditions during transportation and slaughter that reduce and minimize the adverse effects of:

- stress
- loading and unloading
- mixing different groups of animals or animals of different sex
- quality and suitability of mode of transport and handling equipment
- temperatures and relative humidity
- hunger and thirst; and
- the specific needs of each animal

5.8.4.
Animals shall not be treated with synthetic tranquilizers or stimulants prior to or during transport.

5.8.5.
Each animal or group of animals shall be identifiable at each step in the transport and slaughter process.

5.8.6.
Slaughterhouse journey times shall not exceed eight hours.
When there is no certified organic slaughterhouse within eight hours travel time, an animal may be transported for a period in excess.

5.9. Bee Keeping

General Principle
Bee keeping is an important activity that contributes to enhancement of the agriculture and forestry production through the pollinating action of bees.

Recommendations
The hives should consist of natural materials presenting no risk of contamination to the environment or the bee products.

The feeding of colonies may be undertaken, with organic feed, to overcome temporary feed shortages due to climatic or other exceptional circumstances.

When bees are placed in wild areas, consideration should be given to the safety and integrity of the indigenous insect population and pollination requirements of native plants.

The treatment and management of hives should respect all the principles of organic animal husbandry contained elsewhere in these Standards.

The capacity of bees to adapt to local conditions, their vitality and their resistance to disease should be taken into account.

Honey temperatures should be maintained as low as possible during the extraction and processing of products derived from bee keeping.

The collection areas should be large enough and as varied as possible to provide adequate and sufficient nutrition and access to water.

The health of bees should be based on prevention of disease, using techniques such as adequate selection of breeds, favorable environment, balanced diet and appropriate husbandry practices.

The sources of natural nectar, honeydew and pollen should consist essentially of organically produced plants and/or naturally occurring (wild) vegetation.

Standards shall require that:

5.9.1.
Hives shall be situated in organically managed fields and/or wild natural areas. Hives may be placed in an area that ensures access to sources of honeydew, nectar and pollen that meets organic crop production requirements sufficient to supply all of the bees' nutritional needs.

5.9.2.
The operator shall not place hives within foraging distance of fields or other areas with a high contamination risk.

5.9.3.
At the end of the production season, hives shall be left with reserves of honey and pollen sufficient for the colony to survive the dormancy period.

Any supplementary feeding shall be carried out only between the last honey harvest and the start of the next nectar or honeydew flow period. In such cases, organic honey or sugar shall be used.
Exceptions may be made, for a limited time, if organic sugar is not available.

5.9.4.
Bee colonies may be converted to organic production. Introduced bees shall come from organic production units when available.
Bee products may be sold as organically produced when the requirements of these Standards have been complied with for at least one year.

During the conversion period the wax shall be replaced by organically produced wax. Where no prohibited products have been previously used in the hive and there is no risk of contamination of wax, replacement of wax is not necessary.

In cases where all the wax cannot be replaced during a one-year period, the conversion period may be extended with the approval of the standard-setting organization.

5.9.5.
Each beehive shall primarily consist of natural materials. Use of construction materials with potentially toxic effects is prohibited.

5.9.6.
For pest and disease control the following are permitted:

- lactic, formic acid
- oxalic, acetic acid
- sulfur
- natural essential oils (e.g. menthol, eucalyptol, camphor)
- Bacillus thuringiensis
- steam, direct flame and caustic soda for hive disinfection

5.9.7.
Where preventative measures fail, veterinary medicinal products may be used provided that:

- preference is given to phyto-therapeutic and homeopathic treatment, and
- if allopathic chemically synthesized medicinal products are used, the bee products shall not be sold as organic
- treated hives shall be placed in isolation and undergo a conversion period of one year

The practice of destroying the male brood is permitted only to contain infestation with Varroa jacobsoni (mites).

5.9.8.
The health and welfare of the hive shall be primarily achieved by hygiene and hive management.

5.9.9.
The destruction of bees in the combs as a method of harvesting of bee products is prohibited.

5.9.10.
Mutilations, such as clipping of the wings of queen bees, are prohibited.

5.9.11.
Artificial insemination of queen bees is permitted.

5.9.12.
The use of chemical synthetic bee repellents is prohibited during honey extraction operations.

5.9.13.
The use of smoke should be kept to a minimum. Acceptable smoking materials should be natural or from materials that meet the requirements of these standards.

6. *Processing and Handling*

6.1. General

General Principle
Organic processing and handling provides consumers with nutritious, high quality supplies of organic products and organic farmers with a market without compromise to the organic integrity of their products.

Recommendations
Handlers and processors should handle and process organic products separately in both time and place from non-organic products. Handlers and processors should identify and avoid pollution and potential contamination sources.

Standards shall require that:

6.1.1.
Handlers and processors shall not co-mingle organic products with non-organic products.

6.1.2.
All organic products shall be clearly identified as such, and stored and transported in a way that prevents contact with conventional product through the entire process.

6.1.3.
The handler and processor shall take all necessary measures to prevent organic products from being contaminated by pollutants and contaminants, including the cleaning, decontamination, or if necessary disinfection of facilities and equipment.

6.2. Ingredients

General Principle
Organic processed products are only made from organic ingredients.

Recommendations
Processors should use organic ingredients whenever possible.

Enzymes, fermentation organisms, dairy cultures, and other microbiological products should be organically produced and multiplied from a medium composed of organic ingredients, and substances that appear in Appendix 4.

Standards shall require that:

6.2.1.
All ingredients used in an organic processed product shall be organically produced except for those additives and processing aids that appear in Appendix 4 and non-organically produced ingredients that are in compliance with the labeling provisions.
In cases where an ingredient of organic origin is unavailable in sufficient quality or quantity, the standard-setting organization may authorize use of non organic raw materials subject to periodic review and re-evaluation. These materials shall not be genetically engineered.

6.2.2.
Water and salt may be used as ingredients in the production of organic products and are not included in the percentage calculations of organic ingredients.

6.2.3.
Minerals (including trace elements), vitamins and similar isolated ingredients shall not be used unless their use is legally required or where severe dietary or nutritional deficiency can be demonstrated.

6.2.4.
Preparations of micro-organisms and enzymes commonly used in food processing may be used, with the exception of genetically engineered micro-organisms and their products. Processors shall use micro-organisms grown on substrates that consist entirely of organic ingredients and substances on Appendix 4, if available, This includes cultures that are prepared or multiplied in-house.

6.3. Processing Methods

General Principle
Organic food is processed by biological, mechanical and physical methods in a way that maintains the vital quality of each ingredient and the finished product.

Recommendations
Organic products should be processed in a way that maintains nutritional value.

Processors should choose methods that limit the number and quantity of non-organic additives and processing aids.

Standards shall require that:

6.3.1.
Techniques used to process organic food shall be biological, physical, and mechanical in nature. Any additives, processing aids, or other substances that chemically react with or modify organic foods shall comply with the requirements of Appendix 4.

6.3.2.
Extraction shall only take place with water, ethanol, plant and animal oils, vinegar, carbon dioxide, nitrogen. These shall be of a quality appropriate for their purpose.

6.3.3.
Irradiation is not permitted.

6.3.4.
Filtration techniques that chemically react with or modify organic food on a molecular basis shall be restricted. Filtration equipment shall not contain asbestos, or utilize techniques or substances that may negatively affect the product.

6.3.5.
The following conditions of storage are permitted (See Appendix 4):

- controlled atmosphere
- temperature control
- drying
- humidity regulation

6.3.6.
Ethylene gas is permitted for ripening.

6.4. Pest and Disease Control

General Principle
Organic food is protected from pests and diseases by the use of good manufacturing practices that include proper cleaning, sanitation and hygiene, without the use of chemical treatment or irradiation.

Recommendation
Recommended treatments are physical barriers, sound, ultra-sound, light and UV-light, traps (including pheromone traps and static bait traps), temperature control, controlled atmosphere and diatomaceous earth

Standards shall require that:

6.4.1.
A handler or processor is required to manage pests and shall use the following methods according to these priorities:

1. preventative methods such as disruption, elimination of habitat and access to facilities
2. mechanical, physical and biological methods
3. substances according to the Appendices of the IBS
4. substances (other than pesticides) used in traps

6.4.2.
Prohibited pest control practices include, but are not limited to, the following substances and methods:

- pesticides not contained in Appendix 2
- fumigation with ethylene oxide, methyl bromide, aluminum phosphide or other substance not contained in Appendix 4
- ionizing radiation

6.4.3.
The direct use or application of a prohibited method or material renders that product no longer organic. The operator shall take necessary precautions to prevent contamination, including the removal of organic product from the storage or processing facility, and measures to decontaminate the equipment or facilities. Application of prohibited substances to equipment or facilities shall not contaminate organic product handled or processed therein. Application of prohibited substances to equipment or facilities shall not compromise the organic integrity of product handled or processed therein.

6.5. Packaging

General Principle
Organic product packaging has minimal adverse impacts on the product or on the environment.

Recommendations
Processors of organic food should avoid unnecessary packaging materials.

Organic food should be packaged in reusable, recycled, recyclable, and biodegradable packaging whenever possible.

Standards shall require that:

6.5.1.
Packaging material shall not contaminate organic food.

6.5.2.
Packaging materials, and storage containers, or bins that contain a synthetic fungicide, preservative, or fumigant are prohibited.

6.5.3.
Organic produce shall not be packaged in reused bags or containers that have been in contact with any substance likely to compromise the organic integrity of product or ingredient placed in those containers.

7. *Labeling*

General Principle
Organic products are clearly and accurately labeled as organic.

Recommendations
When the full standards requirements have been fulfilled, products should be labeled as "produce of organic agriculture" or a similar description.

The name and address of the person or company legally responsible for the production or processing of the product should be on the label.

Product labels should identify all ingredients, processing methods, and all additives and processing aids.

Labels should contain advice on how to obtain all additional product information.

All components of additives and processing aids should be declared.

Wild ingredients or products should be declared as such, as well as organic.

Standards shall require that:

7.1.1.
The person or company legally responsible for the production or processing of the product and the certification body shall be identifiable.

7.1.2.
To be labeled as "produce of organic agriculture" or equivalent protected terms, a product shall comply with at least these standards.

7.1.3.

- Mixed products where not all ingredients, including additives, are of organic origin and products that are entirely in compliance with these standards, shall be labeled in the following way (percentages in this section refer to raw material weight): Where a minimum of 95% of the ingredients are of certified organic origin, products may be labeled "certified organic" or equivalent and should carry the certification mark of the certification body.
- Where less than 95% but not less than 70% of the ingredients are of certified organic origin, products may not be called "organic". The word "organic" may be used on the principal display in statements like "made with organic ingredients" provided there is a clear statement of the proportion of the organic ingredients. An indication that the product is covered by the certification body may be used, close to the indication of proportion of organic ingredients.
- Where less than 70% of the ingredients are of certified organic origin, the indication that an ingredient is organic may appear in the ingredient list. Such product may not be called "organic".

7.1.4.
All ingredients of a multi-ingredient product shall be listed on the product label in order of their weight percentage. It shall be apparent which ingredients are of organic certified origin and which are not. All additives shall be listed with their full name.

If herbs and/or spices constitute less than 2% of the total weight of the product, they may be listed as "spices" or "herbs" without stating the percentage.

7.1.5.
Added water and salt shall not be included in the percentage calculations of organic ingredients.

7.1.6.
The label for conversion products shall be clearly distinguishable from the label for organic products.

7.1.7. (see also 2.3)
Organic products shall not be labeled as GMO-free in the context of these standards. Any reference to genetic engineering on product labels shall be limited to the production and processing methods themselves having not used GMOs.

8. *Social Justice*

General Principle
Social justice and social rights are an integral part of organic agriculture and processing.

Recommendations
Operators should comply with all ILO conventions relating to labor welfare and the UN Charter of Rights for Children.

All employees and their families should have access to potable water, food, housing, education, transportation and health services.

Operators should provide for the basic social security needs of the employees, including benefits such as maternity, sickness and retirement benefit.

All employees should have equal opportunity and adequate wages when performing the same level of work regardless of color, creed and gender.

Workers should have adequate protection from noise, dust, light and exposure to chemicals that should be within acceptable limits in all production and processing operations.

Operators should respect the rights of indigenous peoples, and should not use or exploit land whose inhabitants or farmers have been or are being impoverished, dispossessed, colonized, expelled, exiled or killed, or which is currently in dispute regarding legal or customary local rights to its use or ownership.

Contracts should be fair, open to negotiation, and honored in good faith.

Standards shall require that:

8.1.
Operators shall have a policy on social justice.
Operators who hire fewer than ten (10) persons for labor and those who operate under a state system that enforces social laws may not be required to have such a policy.

8.2.
In cases where production is based on violation of basic human rights and clear cases of social injustice, that product cannot be declared as organic.

8.3.
Standards shall require that operators not use forced or involuntary labor.

8.4.
Employees and contractors of organic operations have the freedom to associate, the right to organize and the right to bargain collectively.

8.5.
Operators shall provide their employees and contractors equal opportunity and treatment, and shall not act in a discriminatory way.

8.6.
Children employed by organic operators shall be provided with educational opportunities.

SECTION C APPENDICES

Introduction to Appendices

In organic agriculture the maintenance of soil fertility is achieved through the recycling of minerals and organic matter where the nutrients are made available to crops through the activity of soil micro-organisms. Pests, diseases, and weeds can be managed through cultural practices. Organic foods are processed primarily by biological, mechanical, and physical means. The following appendices are used as a guideline for certifiers, and are not intended to be comprehensive. Appendix 3 is used to evaluate products included in Appendix 1 and 2. Appendix 5 is used to evaluate products included in Appendix 4.

Taking into consideration factors such as contamination, risk of nutritional imbalances, importation of inputs from outside the farm, and depletion of natural resources, the use of many of these inputs listed in Appendix 1 and 2 is already restricted (see chapters 4.4 Soil Fertility and Fertilization, 4.5 Pest, Disease and Weed Management including Growth Regulators and 4.6 Avoiding Contamination).
Where there is doubt about whether products should be included in the appendices the precautionary principle should be applied.

Revision Procedure for Appendices

Any IFOAM member can request that IFOAM add, delete, or change the status of an input. A member who wishes IFOAM to determine whether or not an input should be permitted for use in organic production or processing shall submit a dossier. A dossier addresses all of the IFOAM criteria in Appendices 3 and/or 5 and follows a standardized format developed by the Standards Committee. A dossier requesting deletion needs only to address the criteria the non-fulfillment of which are the reason for deletion. Requests from non-members may also be considered at the discretion of the SC.
Dossiers shall be submitted to the SC when the certification body or standard-setting organization has included an input in their standards that does not appear in the appendices or that is not clearly covered by the general standards or generic groups in the standards
Inputs that are the subject of dossiers may be used and/or included in standards during the assessment period but any IFOAM member does so at its own risk and should be mindful that a negative decision may be made.

The Standards Committee reviews the dossier and makes one of five decisions:

1. **Insufficient information.** The dossier is returned to the member with a request to provide more information.
2. **Clarification of existing standards.** The member is informed that the input is already covered (allowed, restricted, or prohibited) by the IBS.
3. **Reference to Experts.** The Standards Committee requires the opinion of recognized experts before it can make a decision. The IFOAM SC passes a dossier to one or several experts for evaluation. If the experts require further information, the SC requests this information and passes it to the experts. The experts provide a recommendation to the SC. The SC passes expert comment back to the applicant for further comment. The SC then makes a decision based on the recommendation and comments of the applicant.
4. **Recommendation for Change of Relevant Appendix.** The SC informs the member that the change is recommended by the SC to be included into the IBS. The input then follows the procedure established for changes of the IBS.
5. **Rejection of the Change.** The SC informs the member that the input is not considered to be appropriate for inclusion in the IBS.

Final decisions and recommendations shall be published in IFOAM internal newsletter and home page.

Appendix 1

Fertilizers and Soil Conditioners

Substances description, compositional requirements	Conditions for use
I. Plant and Animal Origin	
• farmyard manure, slurry and urine	
• guano	
• source separated human excrement from separated sources which are monitored for contamination	Not to be directly applied on edible parts
• vermicastings	
• blood meal, meat meal, bone, bone meal	
• hoof and horn meal, feather meal, fish and fish products, wool, fur, hair, dairy products	
• biodegradable processing by-products, plant or animal origin, e.g. by-products of food, feed, oilseed, brewery, distillery or textile processing.	
• crop and vegetable residues, mulch, green manure, straw	
• wood, bark, sawdust, wood shavings, wood ash, wood charcoal	
• seaweed and seaweed products	
• peat (prohibited for soil conditioning)	Excluding synthetic additives; permitted for inclusion in poting mixes.
• plant preparations and extracts	
• compost made from ingredients listed in this appendix, spent mushroom waste, humus from worms and insects, urban composts from separated sources which are monitored for contamination	
II. Mineral Origin	
• basic slag	
• calcareous and magnesium amendments	
• limestone, gypsum, marl, maerl, chalk, sugar beet lime, calcium chloride,	
• magnesium rock, kieserite and Epsom salt (magnesium sulfate)	
• mineral potassium (e.g. sulfate of potash, muriate of potash, kainite, sylvanite, patentkali)	Shall be obtained by physical procedures but not enriched by chemical processes
• natural phosphates	
• pulverized rock, stone meal	
• clay (e.g. bentonite, perlite, vermiculite, zeolite)	
• sodium chloride	
• trace elements	
• sulfur	
III.Microbiological	
biodegradable processing by-products of microbial origin, e.g. by-products of brewery or distillery processing.	
microbiological preparations based on naturally occurring organisms	
IV. Others	
• biodynamic preparations	

Appendix 2

Crop Protectants and Growth Regulators

Substances Description, compositional requirements	Conditions for use
I. Plant and Animal Origin	
• algal preparations	
• animal preparations and oils	
• beeswax	
• chitin nematicides (natural origin)	
• coffee grounds	
• corn gluten meal (weed control)	
• dairy products (e.g. milk, casein)	
• gelatine	
• lecithin	
• natural acids (e.g. vinegar)	
• neem (*Azadirachta indica*)	
• plant oils	
• plant preparations	
• plant based repellents	
• propolis	
• pyrethrum (*Chrysanthemum cinerariaefolium*),	The synergist Piperonyl butoxide is prohibited. Where certification bodies have previously permitted its use, it shall be prohibited after 2005
• quassia (*Quassia amara*)	
• rotenone (*Derris elliptica, Lonchocarpus* spp. *Thephrosia* spp.)	
• ryania (*Ryania speciosa*)	
• sabadilla	
• tobacco tea (pure nicotine is forbidden)	
II. Mineral Origin	
• chloride of lime	
• clay (e.g. bentonite, perlite, vermiculite, zeolite)	
• copper salts (e.g. sulfate, hydroxide, oxychloride, octanoate)	Max 8 kg/ha per year (on a rolling average basis)
• diatomaceous earth	
• light mineral oils (paraffin)	
• lime sulfur (Calcium polysulfide)	
• Potassium bicarbonate	
• potassium permanganate	
• quicklime	
• silicates (e.g. sodium silicates, quartz)	
• sodium bicarbonate	
• sulfur	
III.Microorganisms	
• fungal preparations	
• bacterial preparations (e.g. *Bacillus thuringiensis*)	
• release of parasites, predators and sterilized insects	
• viral preparations (e.g. *granulosis virus*)	
IV. Others	
• biodynamic preparations	
• calcium hydroxide	
• carbon dioxide	
• ethyl alcohol	
• homeopathic and Ayurvedic preparations	
• sensalt and salty water	
• soda	
• soft soap	
• sulfur dioxide	
V. Traps, Barriers, Repellents	
• physical Methods (e.g. chromatic traps, mechanical traps,)	
• mulches, nets	
• pheromones – in traps and dispensers only	

Appendix 3

Criteria to Evaluate Additional Inputs to Organic Agriculture

Appendices 1 & 2 refer to products for fertilization and plant pest and disease control in organic agriculture. Appendix 3 outlines the criteria to evaluate other inputs into organic production.

The following checklist should be used for amending the permitted substance list for fertilization and soil conditioning purposes:

- The material is essential for achieving or maintaining soil fertility or to fulfill specific nutrient requirements, for specific soil-conditioning and rotation purposes which cannot be satisfied by the practices outlined in Chapter 4 or of other products included in Appendix 1

and

- The ingredients are of plant, animal, microbial or mineral origin which may undergo the following processes:
  - physical (mechanical, thermal)
  - enzymatic
  - microbial (composting, digestion)

and

- Their use does not result in, or contribute to, unacceptable effects on, or contamination of, the environment, including soil organisms

and

- Their use has no unacceptable effect on the quality and safety of the final product.

The following checklist should be used for amending the permitted substance list for the purpose of plant disease or pest and weed control:

- The material is essential for the control of a harmful organism or a particular disease for which other biological, physical or plant breeding alternatives and/or effective management techniques are not available

and

- The substances (active compound) should be plant, animal, microbial or mineral origin which may undergo the following processes:
  - physical
  - enzymatic
  - microbial

and

- Their use does not result in, or contribute to, unacceptable effects on, or contamination of, the environment

- Nature identical products such as pheromones, which are chemically synthesized may be considered if the products are not available in sufficient quantities in their natural form, provided that the conditions for their use do not directly or indirectly contribute to contamination of the environment or the product

Introduction

Inputs should be evaluated regularly and weighed against alternatives. This process of regular evaluation should result in organic production becoming ever more friendly to humans, animals, the environment and the ecosystem.

The following criteria should be used for evaluation of additional inputs to organic agriculture.

1. Necessity

Each input must be necessary. This will be investigated in the context in which the product will be used.

Arguments to prove the necessity of an input shall be drawn from such criteria as yield, product quality, environmental safety, ecological protection, landscape, human and animal welfare.

The use of an input may be restricted to:

- Specific crops (especially perennial crops)
- Specific regions
- Specific conditions under which the input may be used

2. Nature and Mode of Production

Nature

The origin of the input should usually be (in order of preference):

- Organic - vegetative, animal, microbial
- Mineral

Non-natural products which are chemically synthesized and identical to natural products may be used.

When there is any choice, renewable inputs are preferred. The next best choice is inputs of mineral origin and the third choice is inputs which are chemically identical to natural products. There may be ecological, technical or economic arguments to take into consideration in the allowance of chemically identical inputs.

Mode of Production

The ingredients of the inputs may undergo the following processes:

- Mechanical
- Physical
- Enzymatic
- Action of micro-organisms
- Chemical (as an exception and restricted)

Collection

The collection of the raw materials comprising the input shall not affect the stability of the natural habitat nor affect the maintenance of any species within the collection area.

3. Environment

Environmental Safety

The input shall not be harmful or have a lasting negative impact on the environment. Nor should the input give rise to unacceptable pollution of surface or ground water, air or soil. All stages during processing, use and breakdown shall be evaluated.

Chemically Synthesized Products and Heavy Metals

Inputs shall not contain harmful manufactured chemicals (xenobiotic products) where these are known to accumulate in the food chain. Chemically synthesized products may be accepted only if nature identical e.g. pheromones.

The following characteristics of the input shall be taken into account:

Degradability

- All inputs shall be degradable to CO_2, H_2O, and/or to their mineral form.
- Inputs with a high acute toxicity to non-target organisms should have a maximum half-life of five days.
- Natural substances used as inputs which are not considered toxic do not need to be degradable within a limited time.

Acute toxicity to non-target organisms

When inputs have a relatively high acute toxicity for non-target organisms, restrictions for their use is needed. Measures have to be taken to guarantee the survival of these non-target organisms. Maximum amounts allowed for application must be set. When it is not possible to take adequate measures, the use of the input is not permitted.

Long-term chronic toxicity

Inputs that accumulate in organisms or systems of organisms and inputs which have, or are suspected of having, mutagenic or carcinogenic properties shall not be used. If there are any risks, sufficient measures shall be taken to reduce any risk to an acceptable level and to prevent long lasting negative environmental effects.

Mineral inputs should contain as few heavy metals as possible. Due to the lack of any alternative, and long-standing, traditional use in organic agriculture, copper and copper salts are an exception for the time being. The use of copper in any form in organic agriculture must be seen, however, as temporary and use shall be restricted with regard to environmental impact.

4. Human Health and Quality

Human Health

Inputs shall not be harmful to human health. All stages during processing, use and degradation shall be taken into account. Measures shall be taken to reduce any risks and standards set for inputs used in organic production.

Product quality

Inputs shall not have negative effects on the quality of the product - e.g. taste, keeping quality, visual quality.

5. Ethical Aspects - Animal Welfare

Inputs shall not have a negative influence on the natural behavior or physical functioning of animals kept at the farm.

6. Socio Economic Aspects

Consumers' perception: Inputs should not meet resistance or opposition of consumers of organic products. An input might be considered by consumers to be unsafe to the environment or human health, although this has not been scientifically proven. Inputs should not interfere with a general feeling or opinion about what is natural or organic - e.g. genetic engineering.

Appendix 4

List of Approved Additives and Processing Aids

Where the substances listed in this annex can be found in nature, natural sources are preferred. Substances of certified organic origin are preferred.

[1]Int'l Numbering System	Product	Additive	Pro. Aid	Limitation / Note
INS 170	calcium carbonate	X	X	
INS 181	tannin		X	only for wine
INS 184	tannic acid		X	filtration aid for wine
INS 220	sulfur dioxide	X		only for wine
INS 224	potassium metabisulphite	X		only for wine
INS 270	lactic acid	X	X	
INS 290	carbon dioxide	X	X	
INS 300	ascorbic acid	X		
INS 306	tocopherols, mixed natural concentrates	X		
INS 322	lecithin	X	X	
INS 330	citric acid	X	X	
INS 331	sodium citrates	X		
INS 332	potassium citrates	X		
INS 333	calcium citrates	X		
INS 334	tartaric acid	X	X	only for wine
INS 335	sodium tartrate	X	X	
INS 336	potassium tartrate	X	X	
INS 341	mono calcium phosphate	X		only for "raising flour"
INS 342	ammonium phosphate	X		restricted to 0.3 gm/l in wine
INS 400	alginic acid	X		
INS 401	sodium alginate	X		
INS 402	potassium alginate	X		
INS 406	agar	X		
INS 407	carrageenan	X		
INS 410	locust bean gum	X		
INS 412	guar gum	X		
INS 413	tragacanth gum	X		
INS 414	arabic gum	X		only for milk products, fat products, confectionary, sweets, eggs.
INS 415	xanthan gum	X		only fat, fruit and vegetable products and cakes and biscuits
INS 440	pectin	X		unmodified
INS 500	sodium carbonates	X	X	
INS 501	potassium carbonates	X	X	
INS 503	ammonium carbonates	X		only for cereal products, confectionery, cakes and biscuits
INS 504	magnesium carbonates	X		
INS 508	potassium chloride	X		
INS 509	calcium chloride	X	X	
INS 511	magnesium chloride	X	X	only for soybean products

[1] Food additives may contain carriers which shall be evaluated

INS 513	sulfuric acid		X	pH adjustment of water during sugar processing
INS 516	calcium sulfate	X		for soybean products, confectionery and in bakers' yeast
INS 517	ammonium sulfate	X		only for wine, restricted to 0.3 mg/l
INS 524	sodium hydroxide	X	X	for sugar processing and for the surface treatment of traditional bakery products.
INS 526	calcium hydroxide	X	X	food additive for maize tortilla flour, processing aid for sugar
INS 551	silicon dioxide (amorphous)		X	for wine, fruit and vegetable processing
INS 553	talc		X	
INS 901	beeswax		X	
INS 903	carnauba wax		X	
INS 938	argon	X		
INS 941	nitrogen	X	X	
INS 948	oxygen	X	X	
	activated carbon		X	
	bentonite		X	only for fruit and vegetable products
	casein		X	only for wine
	diatomaceous earth		X	only for sweeteners and wine
	egg white albumen		X	only for wine
	ethanol		X	
	gelatin		X	only for wine, fruit and vegetable
	isinglass		X	only for wine
	kaolin		X	
	perlite		X	
	preparations of bark		X	only for sugar

Flavoring Agents

- Organic flavoring extracts (including volatile oils)
- Volatile (essential) oils produced by means of solvents such as oil, water, ethanol, carbon dioxide and mechanical and physical processes
- Natural smoke flavor
- Natural flavoring preparations are only to be approved based on the IFOAM Procedure to Evaluate Additives and Processing Aids (Appendix 5)

Preparations of Micro-organisms and Enzymes for use in food processing (see 6.2.4.)

These may be used as ingredient or processing aids with approval based on the IFOAM Procedure to Evaluate Additives and Processing Aids for Organic Food Products.

- Organic certified micro-organisms
- Preparations of micro-organisms
- Enzymes and enzyme preparations

Appendix 5

Criteria for the Evaluation of Additives and Processing Aids for Organic Food Products

Introduction

Additives, processing aids, flavoring agents and colors should be evaluated according to Appendix 5. The following aspects and criteria should be used for evaluation of additives and processing aids in organic food products.

1. Necessity

Additives and processing aids may only be allowed in organic food products if each additive or processing aid is essential to the production and:

- the authenticity of the product is respected
- the product cannot be produced or preserved without them

2. Criteria for the Approval of Additives and Processing Aids

Where:

- There are no other acceptable technologies available to process or preserve the organic product.
- The use of additives or processing aids which minimize physical or mechanical damage to the foodstuff as a substitute for other technologies which if used would result in such damage
- The hygiene of the product cannot be guaranteed as effectively by other methods (such as a reduction in distribution time or improvement of storage facilities)
- There are no natural food sources available of acceptable quality and quantity which can replace the use of additives or processing aids
- Additives or processing aids do not compromise the authenticity of the product
- The additives or processing aids do not confuse the customer by giving the impression that the final product is of higher quality than is justified by the quality of the raw material. This refers primarily, but not exclusively, to coloring and flavoring agents
- Additives and processing aids should not detract from the overall quality of the product

3. Step by Step Procedure for the use of Additives and Processing Aids

1. Instead of using additives or processing aids, the preferred first choice is:
   - Foods grown under organic conditions which are used as a whole product or are processed in accordance with the IFOAM Basic Standards - e.g. flour used as a thickening agent or vegetable oil as a releasing agent
   - Foods or raw materials of plant and animal origin which are produced only by mechanical or simple physical procedures - e.g. salt.
2. The second choice is:
   - substance isolated from food and produced physically or by enzymes - e.g. starch, tartrates, pectin
   - Purified products of raw materials of non agricultural origin and micro-organisms - e.g. acerola fruit extract, enzymes and micro-organism preparations such as starter cultures.
3. In organic food products the following categories of additives and processing aids are not allowed:
   - "Nature identical" substances
   - Synthetic substances primarily judged as being unnatural or as a "new construction" of food compounds such as acetylated crosslinked starches
   - Additives or processing aids produced by means of genetic engineering
   - Synthetic coloring and synthetic preservatives
   - Carriers and preservatives used in the preparation of additives and processing aids shall also be taken into consideration.

SECTION D DRAFT STANDARDS

9. Plant Breeding and Multiplication Draft Standards

Explanatory Note: This section refers to breeding of organic varieties, not simply use of organic seed

General Principles
Organic plant breeding and variety development is sustainable, enhances genetic diversity and relies on natural reproductive ability.

Organic plant breeding is a holistic approach that respects natural crossing barriers and is based on fertile plants that can establish a viable relationship with the living soil. Organic varieties are obtained by an organic plant breeding program.

The objectives of organic plant breeding are to maintain and further diversify organic production.

Recommendations
Plant breeders should use breeding methods that are suitable for organic farming. All multiplication practices should be under certified organic management.

Breeding methods and materials should minimize depletion of natural resources.

Standards shall require that:

9.1.
To be an organic variety, only suitable methods of breeding shall be used as listed in appendix 6. All multiplication practices except meristem culture shall be under certified organic management.

9.2.
Organic seed and plant materials shall be propagated under organic management for at least one generation, in the case of annuals, and for perennials, two growing periods, or 12 months, whichever is the longer, before being certified as organic seed and plant material.

Appendix 6 *Draft Standards*

List of plant breeding methods and materials *Draft Standard*

	Variation induction techniques	Selection techniques	Maintenance and multiplication	
Suitable and permitted for organic plant breeding	• combination breeding • crossing varieties • bridge crossing • backcrossing • hybrids with fertile F1 • temperature treating • grafting style • cutting style • untreated mentor pollen	• mass selection • pedigree selection • site-determined selection • change in surroundings • change in sowing time • ear bed method • test crossing • indirect selections • DNA diagnostic methods	• generative propagation • vegetative propagation - partitioned tubers - scales, husks, partitioned bulbs, brood bulbs, bulbils - offset bulbs etc. - layer, cut and graft shoots - rhizomes • meristem culture	

10. Aquaculture Production Draft Standards

10.1. Scope

Aquaculture includes the farming of many different species using diverse forms of production in fresh-, brackish- and saltwater. These standards cover carnivorous, omnivorous and herbivorous organisms of all types and at all stages of growth, grown in any form of enclosure such as earthen ponds, tanks and cages (open and closed systems). Wild, sessile organisms in open collecting areas may be certified as organic. Organisms that are moving freely in open waters, and/or that are not capable of inspection according to general procedures for organic production, are not covered by these standards.
This chapter has the status of draft standards.

10.2. Conversion to Organic Aquaculture

General Principles

Conversion to organic aquaculture is a process of developing farming practices that encourage and maintain a viable and sustainable aquatic ecosystem. The time between the start of organic management and certification of the production is known as the conversion period.

Aquaculture production methods can vary widely according to biology of the organisms, technology used, geographic location and local conditions, ownership structure, time span, etc. These aspects should be considered when the length of conversion is specified.

Recommendations

The total production in each farming unit or under each operator's control should be converted to organic aquaculture over a specified period of time. If a production unit is not converted all at once, the standard-setting organization should set standards for how organic and non-organic production and product can be clearly separated in production and documentation, to prevent unintentional mixing of materials and products.

Independent sections of the production unit should be converted in such a way that these standards are completely met on each section before it is certified as organic.

There should be a clear plan of how to proceed with the conversion. This plan should be updated as necessary and cover all aspects relevant to these standards.

The length of the conversion period should be at least one life cycle of the organism in question.

Standards shall require that:

10.2.1.
The operation shall comply with these standards throughout the conversion period. Calculation of the conversion period may not start before the date of the last non-complying input or practice.

10.2.2.
Where the entire production is not converted the following is required:

- physical separation between conventional and organic production units. For sedentary or sessile organisms not living in enclosures (see 6.4.1. and 6.4.2.) the area shall be at an appropriate distance from pollution or harmful influence from conventional aquaculture/agriculture or industry
- organic production shall be capable of inspection with respect to water quality, feed, medication, input factors or any other relevant sections of these standards
- Adequate documentation including financial accounting is available for both production systems
- converted units shall not be switched between organic and conventional management

10.2.3.
The length of the conversion period shall be specified by the standard-setting organization, taking into consideration life cycle and species, environmental factors, and past use of the site with respect to waste, sediments and water quality.

10.2.4.
The standard-setting organization may allow brought-in organisms of conventional origin, provided these are not genetically engineered. Required conversion periods for brought-in organisms shall be defined by the standard-setting organization.

10.2.5.
No conversion period is required in the case of open collecting areas for wild, sedentary organisms (see 6.5.) where the water is free-flowing and not directly or indirectly contaminated by substances prohibited in these standards and where the collecting area can be inspected with respect to water quality, feed, medication, input factors or any other relevant sections of these standards and all requirements are met.

10.3. Basic Conditions

General Principles

Management techniques are governed by the physiological and ethological needs of the organisms in question. The organisms are allowed to meet their basic behavioral needs. Management techniques, especially when applied to influence production levels and speed of growth, will maintain and protect the good health and welfare of the organisms.

When introducing non-native species, special care is taken to avoid permanent disruption to natural ecosystems.

Recommendations

Production should maintain the aquatic environment and surrounding aquatic and terrestrial ecosystem, by using a combination of production practices that:

- encourage and enhance biological cycles
- use a wide range of methods for disease control
- prohibit synthetic fertilizers and avoid chemotherapeutic agents
- provide for polyculture where possible

Converting material of plant and animal origin into animal production results in nutrient and energy losses. For this reason feed sources based on by-products and waste materials of biological origin not suitable for human consumption should be encouraged.

Standards shall require that:

10.3.1.
The standard-setting organization shall set standards that take into account the physiological and behavioral needs of organisms. This shall include provisions regarding:

- sustainable production
- non-stressful stocking density

- water quality
- protection from extremes of sunlight and shade and sudden temperature changes.

10.3.2.
The standard-setting organization may allow artificially prolonged light periods, appropriate to the species and geographical location. Day length shall not be artificially prolonged beyond 16 hours per day.

10.3.3.
Construction materials and production equipment shall not contain paints or impregnating materials with synthetic chemical agents that detrimentally affect the environment or the health of the organisms in question.

10.3.4.
Adequate measures shall be taken to prevent escapes of cultivated species from enclosures.

10.3.5.
Adequate measures shall be taken to prevent predation on species living in enclosures.

10.3.6.
The standard-setting organization shall set relevant standards to prevent excessive and/or improper use of water.

10.4. Location of Production Units

General Principle
Location of organic production units maintains the health of the aquatic environment and surrounding aquatic and terrestrial ecosystem.

Recommendations
Production units should be at appropriate distances from contamination sources and conventional aquaculture.

Aquaculture production should minimize negative environmental impact.

Standards shall require that:

10.4.1.
The distance between organic and conventional production units in open systems shall be defined in the standards.

10.4.2.
The standard-setting organization shall set standards including appropriate separation distances to provide protection from pollution and contamination.

10.5. Location of Collecting Areas

General Principle
Wild, sedentary/sessile organisms in open collecting areas may be certified as organic if they are derived from an unpolluted, stable and sustainable environment.

Recommendations
Collecting areas should be at appropriate distances from contamination and conventional aquaculture.

Negative environmental impact from aquaculture production or harvesting shall be minimized.

Standards shall require that:

10.5.1.
The harvesting/production area shall be clearly defined and shall be capable of inspection with respect to water quality, feed, medication, input factors and other relevant sections of these Standards.

10.5.2.
Collecting areas shall be at appropriate distances from pollution and possible harmful influences from conventional aquaculture. These distances shall be specified by the standards.

10.6. Health and Welfare

General Principles
Management practices achieve a high level of disease resistance and prevention from infection.

All management techniques, especially when influencing production levels and speed of growth, maintain the good health and welfare of the organisms. Living aquatic organisms should be handled as little as possible.
The well being of the organisms is paramount in the choice of treatment for disease or injury.

Recommendations
The cause of outbreaks of disease or infection should be identified, and management practices implemented to prevent the causative events and future out-breaks. When treatment is necessary the use of natural methods and medicines should be the first choice.

Disease treatment should be carried out in a way that minimizes harmful effects on the environment.

Standards shall require that:

10.6.1.
Conventional, veterinary chemicals shall only be used if no other justifiable alternative is available, and/or if the use of such chemicals is required according to national law.

The standards shall define appropriate withholding periods for use of veterinary drugs where required. The length of the withholding periods shall be at least twice that recommended by the manufacturer.

10.6.2.
Prophylactic use of veterinary drugs, except vaccinations in certain cases (see 6.6.3.), is prohibited.

10.6.3.
Vaccinations are permitted if diseases that cannot be controlled by other management techniques are known to exist in the region. Vaccinations are also permitted if they are mandatory under applicable legislation.

Genetically engineered vaccines are prohibited.

10.6.4.
Synthetic hormones and growth promoters are prohibited.

10.6.5.
The certification body shall ensure that current, accurate disease management records are kept. The records shall include:

- identification of the infected and infecting organisms concerned
- details of treatment and duration, including application rate, method of application, frequency of repetition and concentration of organisms
- brand names of drugs used and active ingredients

10.6.6.
In case of irregular behavior by the organisms, the water quality shall be analyzed and adjusted as necessary according to the needs of the organisms.

10.6.7.
Aquatic animals shall not be subject to any kind of mutilation.

10.7. Breeds and Breeding

General Principle
Breeding strategies and practices in organic aquaculture interfere as little as possible with natural behavior of the animals. Natural breeding methods are used.

Recommendations
Breeds should be chosen that are adapted to local conditions.

Breeding goals should aim at obtaining good food quality and efficient conversion of inputs to animal growth.

Brought-in conventional aquatic organisms should spend at least 2/3 of their life in the organic system before being acceptable for certification.

Standards shall require that:

10.7.1.
Breeding shall allow natural birth. The certification body/standard-setting organization may, however, allow the use of production systems that do not provide for natural birth, for instance hatching of fish eggs.

10.7.2.
Where available, brought-in aquatic organisms shall come from organic sources.

10.7.3.
The standard-setting organization shall define the minimum length of time brought in aquatic organisms shall be managed organically before certification is permitted.

10.7.4.
Artificially polyploided organisms and genetically engineered species or breeds, are prohibited.

10.8. Nutrition (Aquaculture)

General Principles
Organic aquaculture production provides a good quality diet balanced according to the nutritional needs of the organism. Feed is only offered to the organisms in a way that allows natural feeding behavior, with minimum loss of feed to the environment.

Feed is comprised of by-products from organic food processing and wild aquatic feed resources not otherwise suited for human consumption.

Recommendations
Feeding and feeding regimes should be organized to give best possible growth on least possible input.

Nutrient management should maintain the biological diversity of the area.

Standards shall require that:

10.8.1.
Aquaculture feeds shall contain 100% certified organic components or wild feed resources. When supplying food collected from the wild, the "Code of Conduct for Responsible Fisheries" (FAO, 1995) shall be followed.

When certified organic components or wild foods are not available, the standard-setting organization may allow feed of conventional origin up to a maximum 5% (by dry weight).

10.8.2.
In systems using brought-in feed inputs, at least 50% of the aquatic animal protein in a diet shall come from by-products or other waste and/or other material that would not be used for human consumption.

10.8.3.
In cases of unforeseen severe natural events, the standard-setting organization may grant exceptions from the percentages mentioned in 6.8.1. and 6.8.2. Specific time limits and conditions shall be established for such exceptions.

10.8.4.
Feed rations should be designed so that plant and/or animal sources supply most of the nutritional needs of the organism.

The standards may permit the use of mineral supplements if they are applied in their natural form.

Use of human feces is restricted.

10.8.5.
The following products shall not be included in or added to the feed or in any other way be given to the organisms:

- Synthetic growth promoters and stimulants
- Synthetic appetizers
- Synthetic antioxidants and preservatives, Urea, Feedstuffs subjected to solvent (e.g. hexane) extraction, amino acid isolates
- material from the same species/genus/family as the one being fed
- synthetic coloring agents
- genetically engineered organisms or products thereof

10.8.6.
Vitamins, trace elements and supplements used shall be of natural origin when available.

The use of substances from synthesized or unnatural sources shall only occur under conditions established by the standard-setting organization.

10.8.7.
The following feed preservatives may be used:

- bacteria, fungi and enzymes
- by-products from the food industry (e.g. molasses)
- plant based products.

Synthetic chemical feed preservatives are permitted in response to severe weather conditions. The standard-setting organization shall establish conditions for their use.

10.9. Harvesting

General Principle
Harvesting certified organic aquatic organisms from enclosures or collecting areas causes the least possible distress to the organisms. The act of collection does not negatively affect natural areas.

Recommendations
Aquatic organisms should be handled in the most considerate manner.

Harvesting or gathering of products shall not exceed the sustainable yield of the ecosystem, or threaten the existence of other species.

Standards shall require that:

10.9.1.
The standard-setting organization shall set standards for handling living organisms that :

- are adapted to the organism in question,
- ensure that harvesting from enclosures and collecting areas is carried out in an effective and appropriately considerate manner.

10.9.2.
The standard-setting organization shall set standards for harvesting or gathering of products from collecting areas that ensure the sustainable yield of the ecosystem is not exceeded, and that the existence of any other species is not threatened.

10.10. Transportation of Living Marine Animals

General Principle
The transportation medium should be appropriate for the species with regards to water quality including salinity, temperature, oxygen etc. Transportation distance, duration and frequency should be minimized.

Recommendations
Transport of living aquatic animals should be minimized and be done in the most considerate manner. Living animals should be monitored regularly and maintained in a healthy state during transportation.

Standards shall require that:

10.10.1.
Transportation shall not cause avoidable stress or injury to the animals. Transportation equipment and/or construction materials shall not have toxic effects.

10.10.2.
The standard-setting organization shall set appropriate transportation requirements regarding:

- water quality , including salinity, temperature, oxygen content, pH etc.
- stocking density
- maximum distance and/or time limits that animals may be restrained in transport containers
- precautions against escape

10.10.3.
Chemically synthesized tranquilizers or stimulants shall not be given to the animals prior to or during transport or at any time.

10.10.4.
There shall be a minimum of one person specifically responsible for the well-being of the animals during transport.

10.11. Slaughter

General Principles
Stress and suffering of the organism is minimized during the slaughter process.

Slaughter management and techniques are governed by careful consideration of the physiology and ethology of the organisms in question and accepted ethical standards.

Recommendation
To avoid unnecessary suffering, the organisms should be in a state of unconsciousness before bleeding out.

Standards shall require that:

10.11.1.
The standard-setting organization shall set standards to ensure that stress in connection with slaughtering is minimized.

10.11.2.
Where applicable, aquatic organisms shall be in a state of unconsciousness before bleeding to death. Equipment used for stunning shall be in good working order and shall quickly remove sensate ability and/or kill the organism.
Equipment shall be regularly inspected and monitored for proper functioning. Equipment relying on gas or electricity shall be constantly monitored.

10.11.3.
The standard-setting organization shall specify slaughterhouse requirements based on local species and cultural customs. This shall include:

- recovery period after transport
- timing between unconsciousness and bleeding
- type and quality of equipment
- contact between living and slaughtered organisms

11. Cleaning, Disinfecting, and Sanitizing Draft Standards

General Principle
Organic food is safe, of high quality, and free of substances used to clean, disinfect, and sanitize food processing facilities.

Recommendations
Processors should design plant layout; install equipment; and devise a cleaning, disinfecting and sanitizing system that prevents the contamination of food and food contact surfaces by prohibited substances, non-organic ingredients, pests, disease-causing organisms, and foreign material.

Handlers and processors should educate personnel in hygiene, sanitation, safe food handling, and organic standards.

Handlers and processors should use physical and mechanical means such as dry heat, moist heat, exclusion, and other non-chemical methods to prevent microbiological contamination.

Operators should select cleaners, sanitizers, and disinfectants based on avoidance of residual contamination, rapid biodegradability, low toxicity, worker safety, and a life-cycle impact of their manufacture, use, and disposal. In particular, operators should avoid endocrine disrupting, ozone depleting, and trihalomethane-forming compounds whenever possible.

The use of cleaning compounds should minimize the disposal of effluent and the use of disinfectants. Gray water recycling for uses other than handling or processing food is preferred over either re-circulation or disposal.

Standards shall require that:

11.1.
Operators shall take all necessary precautions to protect organic food against contamination by substances prohibited in organic farming and handling, pests, disease-causing organisms, and foreign substances.

11.2.
Only water and substances that appear in Appendix 4 may be used in direct contact with organic food.

11.3.
Operations that use cleaners, sanitizers, and disinfectants on food contact surfaces shall use them in a way that maintains the food's organic integrity. The operator is required to perform an intervening event between the use of any cleaner, sanitizer, or disinfectant and the contact of organic food with that surface, unless the substance is otherwise noted in Appendix 4. Acceptable intervening events include a hot-water rinse, a sufficient flush of organic product that is not sold as organic, or adequate time for the substance to volatilize. [Note: Appendix 4 is still under development and currently contains no sanitizers. A list will be developed.]

11.4.
Operators shall prevent the residues of boiler water additives from direct contact with organic food by the use of entrained water, filters, traps, or other means that prevent steam in contact with organic foods from carrying such compounds.

12. Processing of Textiles Draft Standards

12.1. Scope

The textile standards are applicable to all kinds of natural fiber products including, but not limited to:

- yarn
- fabrics
- ready made clothes, clothing, rugs and furnishing textiles
- non woven products

These standards cover the processing of certified organic fibers and certified wild fibers.

12.2. Raw Materials

General Principles
The raw materials in a textile product labeled as organic are 100% organically produced.

The processing of raw materials into fibers is done with consideration to the environment.

The non textile raw materials in a textile product to be labeled as organic are harmless to the environment and humans, in production, use and disposal.

The raw materials should contain the characteristics of the desired end product (e.g. natural colored fibers, natural flame retardant).

Recommendations
Natural fibers should be used.

Where no preferred alternative is available, the standard-setting organization may grant exceptions on a case by case basis. In all cases the standard-setting organization should regulate the contents and/or the emission of non-desirable substances in both textiles and non textile accessories.

Standards shall require that:

12.2.1.
The use of cotton defoliants is prohibited.

Field retting of flax and other fibers is permitted. If wet retting and steam retting is used, the standard-setting organization shall require appropriate wastewater treatment or use, to avoid water pollution.

Mulberry trees for silk production shall be organically cultivated.
If silk is certified, the standards shall include conditions for silkworm breeding and for reeling.
Such standards shall require that:

- All agents including disinfectants in silkworm cultivation, egg cultivation and reeling shall fulfill the requirements for processing as laid down in these standards
- Hormones and veterinary treatments shall be regulated in line with IFOAM animal standards
- Tensides used in silk degumming (cocoon boiling) shall be readily biodegradable (OECD 301), and shall be an appropriate waste water treatment

Tensides used in wools scouring shall be readily biodegradable (OECD 301) and there shall be an appropriate wastewater treatment.

12.2.2.
When needed to produce a long life quality, a certain function or fashion compatible with organic principles the standard-setting organization may allow the use of non certified materials on a case by case basis, according to the following conditions:

Non certified natural fibers
When a certified organic natural fiber is not available in the required quantity and quality, the standard-setting organization may allow non-certified natural fibers to be mixed with the certified fibers or used in certain details. The same type of fiber shall not be of certified organic and non-certified origin.

When synthetic, regenerated cellulose or recycled fibers are used, the following are excluded:

- halogen containing fibers (chlorofiber, Teflon, etc.)
- fibers which are, or whose production is, hazardous to humans, workers or the environment

The standards shall include lists of approved synthetics and their permitted percentages.

The mixing in of non organic fibers shall be in accordance with IFOAM labeling standards (Chapter 10).

12.2.3.
The Standards shall require that products be not certified where non-textile accessories constitute the major part of the product, unless they have developed criteria for such details.

Accessories shall not contain Cadmium at levels greater than 0.1 mg/kg.

12.3. Processing in General

General Principle
All processing units should follow an integrated environmental management system

Recommendation
Processing should take place using appropriate techniques that will be least damaging to the environment.

Standards shall require that:

12.3.1.
IFOAM standards for storage, separation, identification, hygiene and pest management apply. IFOAM standards for cleaning and sanitation, food additives and processing aids do not apply.

The standards may permit individual exceptions for the requirements of separation in instances where such separation could lead to substantial environmental or economic disadvantages, and where there is no risk of the mixing of raw materials e.g. the possible contact of organic product with recycled fluids that have been previously used for conventional production (mercerizing, sizing, rinsing, etc.) When granting such exceptions, the standard-setting organization shall establish that there is no contamination by the actual process.

12.4. Environmental Criteria for Wet Processing

General Principle
The wet processing of organic fibers into textiles prevents negative environmental impacts.

Recommendations
The standards should include conditions for the treatment of effluents and sewage regarding BOD and COD (or TOC or TOD), heavy metals and phosphorus, as well as disposal of sewage sludge and solids.

The quality of the waste treatment resulting from inputs used should be considered.

Standards shall require that:

12.4.1.
Textile production units shall:

- comply with national, state and local authority environment regulations
- keep accurate, up to date records of the use of chemicals, energy, water consumption and wastewater treatment, including the disposal of sewage sludge and analysis of effluents
- develop an environmental plan for improving the environmental performance of the production unit within one year after the initial certification if not previously developed.

12.4.2.
The certification body shall only certify production units where there is at least functioning internal or external sewage water treatment (sedimentation, temperature, pH regulation).

12.4.3.
The certification body may apply these environmental criteria only to the processing of the certified textiles and not to the whole factory.

12.5. Processing Inputs– General

The use of chemical inputs (dyes, auxiliaries, etc.) in textile processing is restricted. The standards do not apply to lubricating oils for machinery, paints for machines and facilities and similar, unless they are likely to contaminate the fibers.

General principles
The processing of organic fibers utilizes only organic or natural substances. Where this is not possible the processing avoids the use of synthetic chemicals and substances that may pollute the environment or pose a hazard for workers or consumers.

When assessing the environmental impact of input products, the total life cycle of the end product is considered.

Recommendations
Processing of organic textiles should avoid the use of synthetic chemicals, substances that are environmental pollutants and substances that pose a health or safety hazard for workers or consumers.

The use of bio-accumulating input products and heavy metals should be avoided.

Standards shall require that:

12.5.1.
All input products shall be declared by the operator. Relevant data assessment shall be made, including reference to material safety data sheets, *etc.* Preservatives shall always be declared.

The operator shall have all recipes used on file and the inspector shall check them at every inspection to verify the non-use of prohibited inputs or compliance with limitations on use of restricted products.

12.5.2.
The standards shall include criteria for evaluation of input products. Such criteria shall consider both the biodegradability and the toxicity of the product and metabolites derived from biodegradation of the input product. Criteria should seek to comply with international accepted criteria.

	Biodegradability 28 days (OECD 302 A)	Toxicity for aquatic organisms (LC_{50} or EC_{50} or IC_{50} for algae, water-fleas and fish)
May be approved	< 70%	>100 mg/l
May be approved	> 70%	10-100 mg/l
Prohibited	<70%	< 100 mg/l
Prohibited		< 1 mg/l

The same rules should apply for metabolites.
Considering the need for gaining more experience in the evaluation of input products, the standard-setting organization may use existing models or develop alternative models if these ensure satisfactory environmental performance. Such alternative models shall be published and the standard-setting organization shall document the results of such a model.

In any case, products may not be used if they or their metabolites are either:
- carcinogenic (R45)*
- mutagenic (R46)
- teratogenic (R60-63)
- toxic to mammals – LD_{50}<2000 mg/kg shall not be permitted
- known to be bio-accumulative and are not biodegradable (<70% 28d OECD 302A)
- listed on the negative list in the list as below (8.5.3.)

(*) "R" refers to the European system as described in Reg. 92/32/EEC

In addition the standard-setting organization shall not approve the use of an input product if there are appropriate alternatives available that:
- are natural
- have less environmental impact

12.5.3.
The standards shall include a positive list of substances and a negative list, where substances not permitted by these Standards shall be identified.

The following chemicals may not be present in any product at a level greater than 1%:
- | -MES
- antimony
- AOX - Absorbable halogenated hydrocarbons, and substances that can cause their formation.
- APEO
- DEHP
- DTPA
- EDTA
- halogenated flame proof agents
- heavy metals (see also 8.6.6)
- LAS
- organo-chloride carriers
- quarternary ammonium compounds (DTDMAC etc.)

12.6. Special Regulations for Different Steps in Processing of textiles.

Standards shall require that:
Apart from the general criteria these special regulations for different steps apply:

12.6.1.
Spinning oils (avivage) and knitting oils (needle oil) shall be readily biodegradable or made from vegetable or animal origin.

12.6.2.
Sizes shall be ultimately degradable, or be recycled to a minimum of 75%.

12.6.3.
Sodium hydroxide or other alkali is permitted for mercerizing, but shall be recycled to the highest possible extent.

12.6.4.
Chlorine and perborate bleaching agents shall not be permitted for bleaching, color removal or stain removal.

12.6.5.
Mordents may not contain heavy metals above the limits indicated under "dyestuffs".

12.6.6.
The following dyes may be used:
- dyes derived from plants (CI 75 000-75 999)
- mineral dyes not containing heavy metals

The following are excluded:
- heavy metal dyes
- complex bonded metals in excess of 1g metal/kg textile.
- The standard-setting organization may grant limited exceptions for pigments containing copper if other alternatives are not available.
- dyes capable of releasing aromatic amines that are known or suspected carcinogens
- dyes that are, or are suspected of being, allergenic or carcinogenic

For other dyestuffs the general criteria should be applied for evaluation of their use.

Dyestuffs shall not contain more than:

antimony 50 ppm	arsenic 50 ppm	barium 100 ppm
lead 100 ppm	cadmium 20 ppm	chromium 100 ppm
iron 2500 ppm	copper 250 ppm	manganese 1000 ppm
nickel 200 ppm	mercury 4 ppm	selenium 20 ppm
silver 100 ppm	zinc 1500 ppm	tin 250 ppm
		(ETAD Agreement)

Note: While heavy metals as dyestuffs are prohibited, they can appear as contaminants in other dyes. The limits above relate to such contamination.
Only printing methods based on water or natural oils are permitted.
Aromatic solvents are prohibited.
Color residues shall be recycled or disposed of in a safe way.

12.6.7.
No restrictions apply to mechanical and physical treatments.

12.6.8.
Standards shall include conditions to regulate other methods and treatments that shall at least satisfy the general criteria for chemicals.

12.7. Labeling of textiles

General principle
The labeling should be correct and contain information useful to the consumer.

Recommendation
The standards should require that any substances known to cause allergies and which have been used during textile processing should be mentioned on the label.

Standards shall require that:

12.7.1.
Labeling of textiles follows IFOAM standards on labeling (see Chapter 9) with the following special regulations:

- calculation by weight shall exclude weight of the non textile accessories (buttons, zippers, etc.)
- materials in non-textile accessories shall be declared
- information on labels required by applicable local labeling regulations shall be included
- raw materials of textiles may be labeled "made with (...%) organically produced fibers" provided at least 70% of the fibers are certified organic
- labeling of the final product as organic, other than reference to raw materials of agricultural origin, cannot occur until the standard-setting organization has developed a positive list of ingredients and processing aids

12.7.2.
Where the certified textile constitutes only part of the final product (i.e. furniture) the textiles may be declared according to this standard, but it shall be clear from the labeling that this only relates to the textile part of the product.

Abbreviations in the textile standards

CI	Color Index
COD	Chemical Oxygen Demand
EC_{50}	Effect concentration (50% effect)
ETAD	Ecological and Toxicological Association of the Dyestuff Manufacturing Industries
IC_{50}	Inhibition concentration (10% inhibition)
LC_{50}	Lethal concentration (50% mortality)
OECD	Organisation of Economic Co-operation and Development
TOC	Total Organic Carbon
TOD	Total Oxygen Demand
∫ -MES	∫ -methyl ester sulfonate (C16/18)
AOX	Absorbable halogenated hydrocarbons, and substances that can cause their formation
APEO	Alkylphenoloxylate
DEHP	Diethylhexylphtalate
DTPA	Diethylenetriamine penta-acetate
EDTA	Ethylendiamine tetra-acetate
LAS	Linear alkyl benzene sulfonate
PCB	Polychlorinated Biphenyls
PCP	Pentachloephenol
TCP	Tetrachlorphenol

13. Forest Management Draft Standards

Introduction

Forest management includes both timber extraction and harvesting of non-timber forest products. This includes products from both natural forest (i.e. primary forest and well developed secondary forest) and plantations. Production or harvesting of non-timber forest products is covered in chapter 4 and/or 4.8. This chapter has the status of draft standards.

13.1. Conversion to Organic Forest Management

General Principle
Conversion defines the process of developing a certifiable, viable and sustainable forest management system. The time between the start of organic management and certification of the production is known as the conversion period.

Recommendations
The total production should be converted to meet the requirements of the standards over a period of time. If a complete production unit is not converted simultaneously, then separate sections should be converted in such a way that these standards are met in full.

Standards shall require that:

13.1.1.
Those responsible for production shall have a clear and documented management plan which includes how to proceed with conversion. This plan shall be updated when necessary, and shall include:

- history and existing situation
- a schedule for the progress of conversion
- aspects and practices that shall be changed and implemented during conversion

13.1.2.
A minimum conversion period of 3 years shall apply to new plantation forest previously treated with fertilizers and/or pest and disease control not permitted by Appendix 1 and 2 of the IBS.

13.1.3.
The start of the conversion period shall be calculated from the date of application to the certification body or, alternatively, from the date of the last application of unapproved inputs providing the operator can demonstrate that standards requirements have been met from that date. Calculation of the conversion period may not start before the date of the last non-complying input or practice.

13.1.4.
No conversion period is required in case of natural and plantation forest that currently meets the full requirements of these Standards and has done so continuously for a period exceeding the conversion period stipulated in 13.1.2. This shall be supported by documentary evidence.

13.2. Environmental Impact

General Principle
Forest management conserves biological diversity and its associated values, water resources, soils and unique and fragile ecosystems and landscapes. Such management maintains the ecological functions and the integrity of the forest bio-system.

Recommendations
Forest management operations should encourage the efficient use of multiple products and service opportunities provided to ensure economic viability and to deliver a wide range of environmental and social benefits.

Standards shall require that:

13.2.1.
An assessment of environmental impact shall be completed appropriate to the scale and intensity of forest management, and the uniqueness of the affected resources. The results of the assessment shall be adequately integrated into the management plan. Assessments shall include considerations at the landscape level as well as impacts of on-site processing facilities. All potential environmental impacts shall be assessed prior to site disturbance.

13.2.2.
Safeguards shall exist which protect rare, threatened and endangered species and their habitats (e.g. nesting and feeding areas). Conservation zones and protected areas shall be established appropriate to the scale and intensity of forest management and the uniqueness of the affected resources. Ecologically damaging hunting, fishing, trapping and collecting shall be prohibited.

13.2.3.
Ecological functions and values that shall be maintained intact, enhanced or restored include:

- forest regeneration and succession
- genetic, species and ecosystem diversity
- natural cycles affecting the productivity of the forest ecosystem

13.2.4.
Representative samples of existing ecosystems within the landscape shall be protected in their undisturbed natural state and recorded on maps.

13.3. Maintenance of Natural Forest

General Principle
Primary forest, well developed secondary forests and sites of major environmental, social or cultural significance are conserved. Tree plantations or other land uses may not replace such areas.

Standards shall require that:

13.3.1.
Trees planted in natural forests may supplement natural regeneration, fill gaps or contribute to the conservation of genetic resources. Such plantings shall not replace or significantly alter the natural ecosystem.

13.3.2.
The use of replanting as a technique for regenerating stands of certain natural forest types may be appropriate under certain circumstances. The standard-setting organization shall define acceptable tree planting areas and density.

13.3.3.
Where exotic species are introduced disturbance to the ecosystem shall be minimized and shall be evaluated by the certification body.

13.4. Plantations

General Principle

Plantations are planned and managed in accordance with the forestry standards. As plantations can provide an array of social and economic benefits and can contribute to satisfying needs for forest products, they should complement the management of, reduce pressures on, and promote restoration and conservation of natural forests.

Standards shall require that:

13.4.1.
The management objectives of the plantation including natural forest conservation and restoration objectives, shall be explicitly stated in a management plan. In order to enhance the conservation of biological diversity, native species shall be preferred over exotic species in the establishment of plantations and the restoration of degraded ecosystems. Exotic species shall be used only when it can be demonstrated that their performance will not severely imbalance the natural ecosystem and this shall be carefully monitored.

13.4.2.
The design and layout of plantations shall promote the protection, restoration and conservation of natural forests, and not increase pressures on natural forests. Wildlife corridors, streamside zones and a mosaic of stands of different ages and rotation periods consistent with the scale of the operation shall be used in the layout of the plantation. The scale and layout of plantation blocks shall be consistent with forest patterns found within the natural landscape.

13.4.3.
Sufficient diversity shall be created in the composition of plantations to enhance economic, ecological and social stability. Such diversity may include the size and spatial distribution of management units within the landscape, the number and genetic composition of species, and their age classes and structures.

13.4.4.
The selection of species for planting shall be based on their overall suitability for the site and their compatibility with specified management objectives. To enhance the conservation of biological diversity, native species are preferred to exotic species in the establishment of plantations and the restoration of degraded ecosystems. Exotic species may be introduced only when their performance proves superior to native species and shall be carefully monitored to detect mortality, disease or insect outbreaks and, in particular, any adverse ecological impact.

13.4.5.
A proportion of the total plantation forest area and appropriate to the scale of the plantation shall be managed so as to ultimately restore the site to a natural forest cover. This area shall be representative of the total area and the standards shall specify minimum levels.

13.4.6.
Measures shall be taken to maintain or improve soil structure, fertility and biological activity. Chapter 4.4 of the IBS applies to fertilization and Chapter 2.2 of the IBS applies to water and soil conservation. These shall apply to plantation forest management.

13.4.7.
Measures shall be taken to prevent and minimize outbreaks of pests, diseases, fire and the introduction of invasive plants. Only those fertilizer and crop protection products identified in Appendix 1 & 2 of the IBS may be used.
To evaluate whether other products are acceptable additional to those already listed in the Appendices, the IFOAM guidelines on evaluation of inputs to organic agriculture shall be applied. The use of fire as a management tool shall be regulated in the management plan. Traditional knowledge on how and when to use fire in the landscape, shall be taken into account.

13.4.8.
Appropriate to the scale and diversity of the operation, monitoring of the plantation shall include regular assessment of its on-site and off-site ecological and social impacts concerning, for example, natural regeneration, effects on water resources and soil fertility, and impacts on the welfare and social well being of local peoples. No species shall be planted on a large scale until local trials and/or experience have shown that they are ecologically harmonious with the site, and do not have significant negative ecological impacts on other ecosystems. Special attention shall be paid to social issues of land acquisition for plantations, and in particular the protection of local customary rights of ownership, use or access.

13.5. Non Timber Forest Products

General Principle

Non-timber forest products are integral parts of the forest ecosystem and are considered within management of the overall sustainability of the forest.

Standards shall require that:

13.5.1.
These standards are used in conjunction with 2.4.

13.5.2.
When non-timber forest products are taken from a forest, the ecological impact shall be assessed to identify products or harvesting methods that may:

- endanger the productivity or existence of a species or variety
- be detrimental to nutrient cycling
- be harmful to wildlife
- be necessary for subsistence use.

When any animal products are being collected, animal welfare shall be taken into consideration.

13.5.3.
Where timber extraction is the priority in forest management, the management plan shall specify which products are to be collected and consider the long and short-term impact on non-timber forest products.

13.5.4.
Harvesting of non-timber forest products shall respect the cultural and religious significance of the forest and its organisms and products to local and indigenous communities.

13.5.5.
Non-timber forest product harvesting methods shall be appropriate to the species or species group. Agroforestry is permitted.